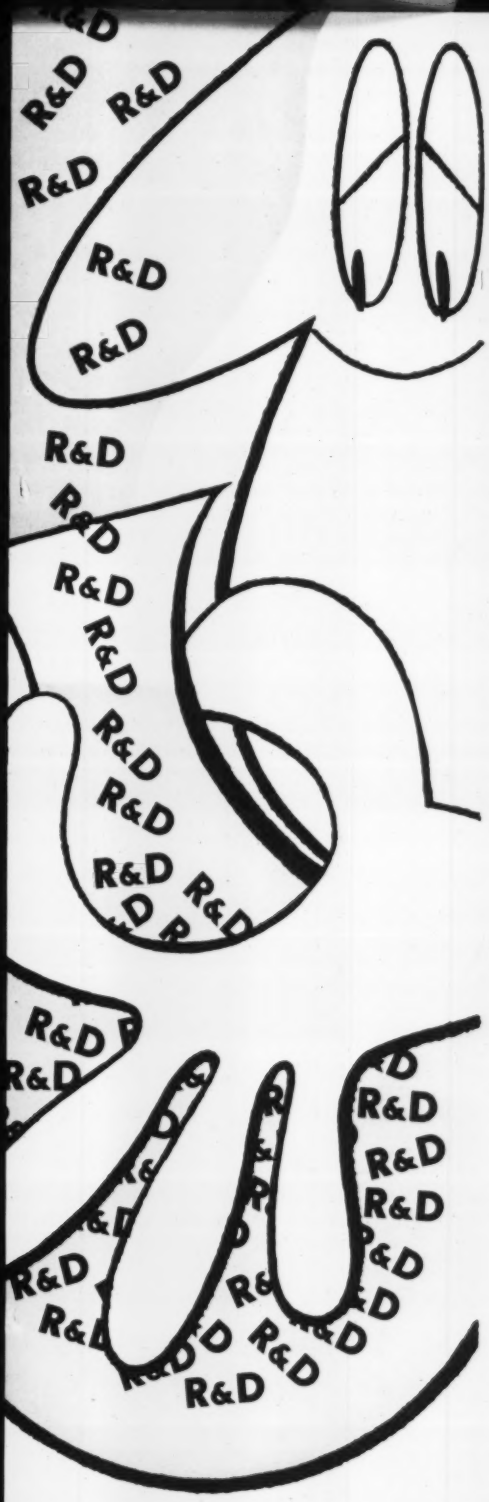
AUGUST 17, 1959

STEEL
The Metalworking Weekly

A PENTON PUBLICATION



Steel Shortage Closes a Few Plants, Most Stocks O.K. as Strike Drags On

The Steel Firms Still Operating

Joining & Assembly Equipment Orders To Climb 32% in Second Half of '59

How Standardization Slashes Costs

Induction Hardener Prunes Expenses

Where Steel Went in First Half

Increasing Research, Development . . PAGE 87

COMPLETE CONTENTS
TURN PAGE

METALWORKING OUTLOOK
PAGE 35

A PROGRAM FOR MANAGEMENT
1959 . . . No. 7

How B&W JOB-MATCHED TUBING helps you make a better product

. . . The complete range of sizes and types of finish plus close tolerances provide freedom of design . . . *helps you make a better product.*

. . . Quality controlled from start to finish helps provide a wide range of end use possibilities . . . *helps you make a better product.*

. . . Controlled mechanical properties provide flexibility of design . . . *helps you make a better product.*

These are just some of the reasons why it pays to specify B&W Job-Matched Tubing.

Call your local B&W District Sales Specialist, or write for Bulletin TB-361 for full information. The Babcock & Wilcox Company, Tubular Products Division, Beaver Falls, Pa.

Metal Show—Booth 528
International Amphitheater
Chicago—November 2-8

B&W

THE BABCOCK & WILCOX COMPANY

TUBULAR PRODUCTS DIVISION

TA-9027-G3

Seamless and welded tubular products, solid extrusions, seamless welding fittings and forged steel flanges—in carbon, alloy and stainless steels and special metals

This Week in STEEL

The Metalworking Weekly

August 17, 1959 Vol. 145—No. 7

Metalworking Outlook, Page 35

The Editor's Views—The Extra Ten 41
▶ Steel Shortage Closes a Few Plants, Most Stocks Still O.K. ... 43
▶ The Steel Firms Still Operating—Have 15% of ingot capacity .. 44
Copper Peace Odds Narrow—Outlook for early settlement dim 45
How to End the Steel Strike—Here's one suggestion 46
Salesman Car Costs Jump to New Peak—Now 8.76 cents a mile 47
How McGraw-Edison Grows—Diversification pays big dividends 48
▶ Joining & Assembly Equipment Orders to Climb 32 Per Cent 50
Sixth in STEEL's series on metalworking's capital equipment spending
Foundry Total Dips to 6085—That's 235 under 1957's figure 55
Ten Ways Effective Inventory Control Can Benefit You 58
Metalworkers to Expand on Canadian Shore of Seaway 75
▶ Increasing Research, Development 87
No. 7 in STEEL's 1959 Program for Management series

Technical Outlook, Page 97

▶ Standardization Trims Material Purchasing Costs 98
Start of a new STEEL series on How to Beat the Cost Crisis
▶ Induction Hardener Helps Axlemaker Eliminate Warping 100
Regrind Trims Gear Maintenance Costs—What GE found out 102
Internal Broach Takes Long Spars—Permits switch in material 104
Progress in Steelmaking—Bubbling Helium Helps Degas Steel 106
Finishing Technique Saves $37,000—Cost of machine: $13,000 110
Tool Removes Stuck Wires, Saves Castings from Scrap 113
Bandsaws Boost Production of Heavy Turbine Bearings 116
Centerless Belt Grinding Meets Close Tolerances 117

Market Outlook, Page 129

Complete Index to Market News and Prices 129
▶ First Half Mill Shipments Hit Peak—Many new records set ... 131
More Galvanized Sheets Used in Highway Systems 132
Steelworks Operation Chart and District Ingot Rates 138
Scrap Prices Hold on Light Sales—Composite stays at $38.33 .. 151
Nonferrous Metals—Action Stirred Up in Capital 154

▶ Articles listed on cover.

WHERE TO FIND

Metalworking Pulse ..Turn page
STEEL Servicenter 5
Calendar of Meetings 10
Editorial & Business Staffs 16
Windows of Washington . 52
Mirrors of Motordom 61
The Business Trend 65
Men of Industry 69
Obituaries 72
New Products 119
New Literature 126
Advertising Index 159

Index available semiannually.

STEEL is also indexed by Engineering Index, 29 W. 39th St., New York 18, N. Y.

STEEL, the metalworking weekly, is selectively distributed without charge to qualified management personnel with administrative, production, engineering, or purchasing functions in U. S. metalworking plants employing 20 or more. Those unable to qualify, or those wishing home delivered copies, may purchase copies at these rates: U. S. and possessions and Canada, $10 a year; all other countries, $20 a year; single copies, 50 cents. Metalworking Yearbook issue, $2. Published every Monday and copyright 1959 by The Penton Publishing Co., Penton Bldg., Cleveland 13, Ohio. Accepted as controlled circulation publication at Cleveland, Ohio.

Metalworking Pulse ▶

TURN

Metalworking Pulse

INDUSTRIAL PRODUCTION INDEX

	WEEK ENDED AUG. 8	PREVIOUS WEEK	MONTH AGO	YEAR AGO
(1947-49=100) Based on steel output, electric power output, freight carloadings, auto assemblies	117†	121	162	137

†Preliminary.

The steel strike and Detroit's 1959 model phaseouts were major dampening influences in latest industrial production figures, but unexpected strength from electrical energy output, which set a record, held the drop in STEEL's index to 4 points.

Details on Page 65

U. S. PASSENGER CAR PRODUCTION

	WEEK ENDED AUG. 15	PREVIOUS WEEK	MONTH AGO	YEAR AGO
Number of units assembled ..... (Source: Ward's Automotive Reports.)	80,000*	106,350†	127,502	59.677

*Estimated. †Preliminary.

Changeovers to 1960 model production sliced another chunk out of auto production, with further drops to come. Dealers report record inventories, are in no hurry for introduction of the '60s.

Details on Page 62

NATIONAL STEEL INGOT PRODUCTION

	WEEK ENDED AUG. 16	PREVIOUS WEEK	MONTH AGO	YEAR AGO
Net tons (thousands)	340*	318	1,097	1,632
Index (1947-49=100)	21.2*	19.8	68.3	101.6
Percentage of capacity	12*	11.2	38.7	60.5

*Estimated by STEEL; comparative figures reported by AISI.

Mills have been turning out between 318,000 and 345,000 tons of ingots and steel for castings since the strike was called in mid-July. This new supply is augmented by offerings of service centers and importers.

Details on Page 138

STEEL SCRAP PRICE COMPOSITE

	AUG. 12	WEEK AGO	MONTH AGO	YEAR AGO
Based on No. 1 heavy melting grade at Pittsburgh	$38.33	$38.33	$38.67	$41.33

Prices on steelmaking grades of scrap are firm despite continued light buying, part of which is for tonnages to be delivered after the strike is settled. Export demand is a strong market factor in the East.

Details on Page 151

FINISHED STEEL PRICE INDEX

	AUG. 11	WEEK AGO	MONTH AGO	YEAR AGO
Based on Bureau of Labor Statistics data (1947-49=100)	186.7	186.7	186.7	186.3

Orders being booked by mills for delivery later in the year carry, as usual, the specification that prices will be those in effect on date of shipment. Producers maintain their "hold the line" objective.

Details on Page 139

Tool Steel Topics

BETHLEHEM STEEL

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

Export Distributor: Bethlehem Steel Export Corporation

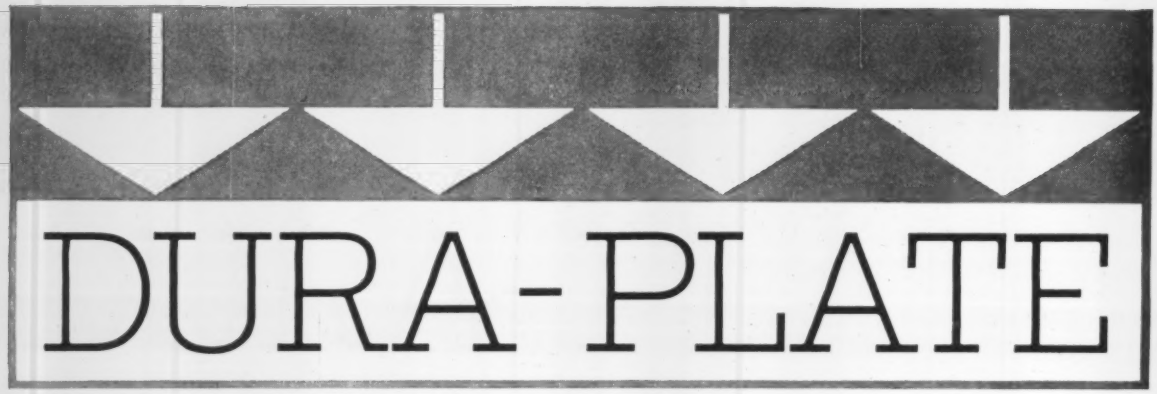
now...Lehigh H leads the field in machinability

As the result of its special annealed structure, developed and tested over a period of several years, Bethlehem's Lehigh H tool steel (AISI Type D-2) now leads the field in machinability among the high-carbon, high-chrome tool steels sold today. In impartial studies, the machinability of Lehigh H has been proved outstanding as a most economical grade for a wide range of difficult applications.

In addition to its better machinability, Lehigh H now has improved wear-resistance, because its vanadium content has been increased to 1 pct. Other important advantages of Lehigh H: improved carbide distribution and increased center density, based on U. S. Patent No. 2,809,109, issued to Bethlehem. Its uniform structure makes possible a better response to heat-treatment, and results in maximum service life for tools and dies, even in the most severe service.

Lehigh H is the D-2 type of air-hardening high-carbon, high-chromium tool steel, which is well known for minimum dimensional change in heat-treatment. For tops in machinability, and for all-around dependability and economy, be sure to order the new improved Lehigh H from your Bethlehem tool steel distributor.

BROWN LIPE CHAPIN



New Chrome Plating advance gives bright work new dimension in durability!

Here's a shining example of the many benefits available for your products at Brown-Lipe-Chapin. It's Brown-Lipe-Chapin's new DURA-PLATE! This new and unique process of chrome plating gives your product active sales appeal with the rich quality of gleaming chrome . . . and adds a new depth of durability that will last the life of your product.

DURA-PLATE consists of two layers of laminar and columnar nickel with a layer of chrome *five times as thick* as produced by conventional methods. The result is a surface almost impenetrable to corrosion. DURA-PLATE can be applied on any product made of steel, or on zinc die castings . . . at no extra cost!

DURA-PLATE is the result of the advanced research, the development of new techniques and thorough testing that continue at Brown-Lipe-Chapin to help make your products better.

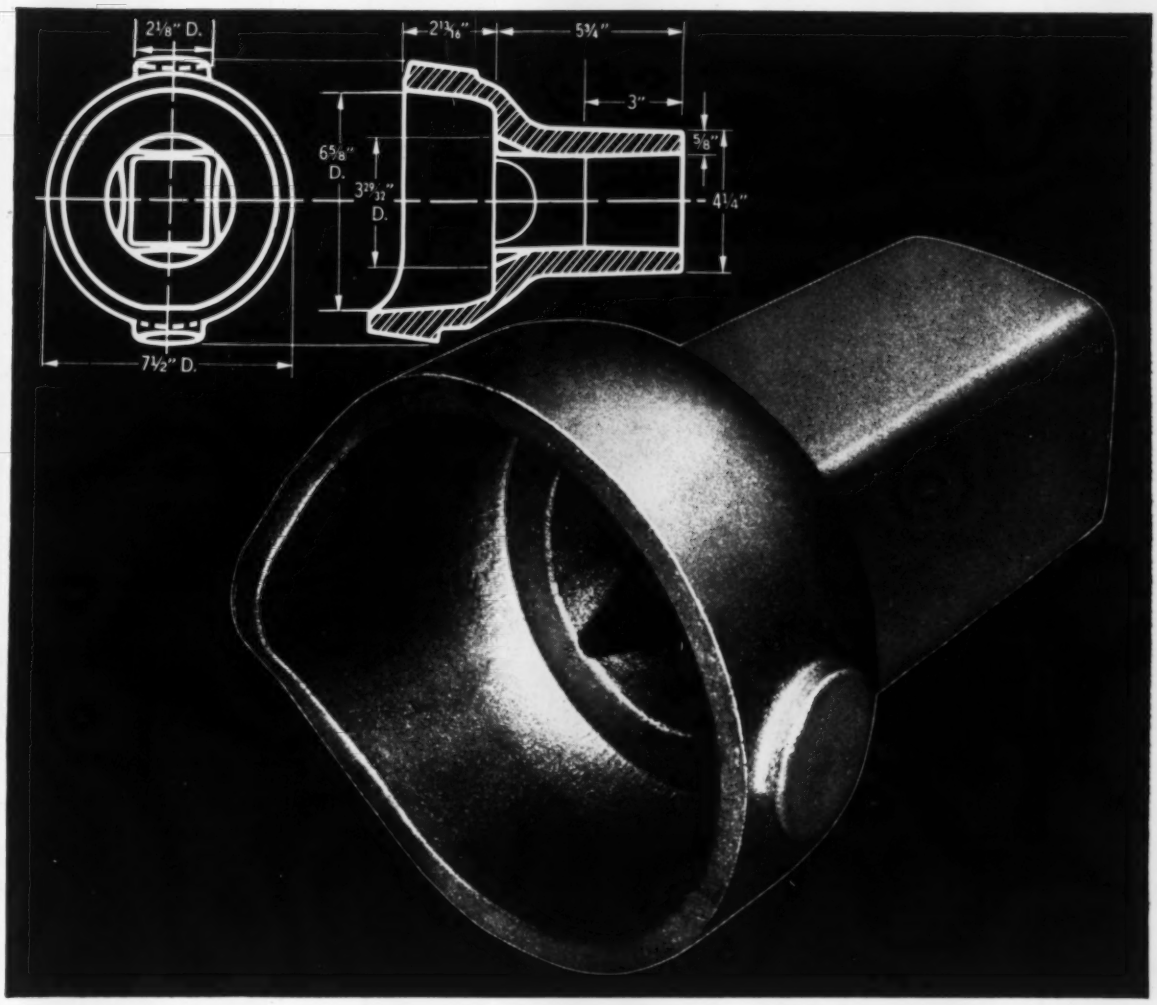
DURA-PLATE is typical of the many benefits you get from Brown-Lipe-Chapin when you call on their extensive facilities for die casting, metal stampings of all kinds, electroplating, anodizing and painting.

If you're looking for a bright difference in your product, call on Brown-Lipe-Chapin, Division of General Motors Corporation, Syracuse, New York.

GM GENERAL MOTORS

RELIABILITY by BROWN·LIPE·CHAPIN

DIVISION OF GENERAL MOTORS CORPORATION



Odd Shape...Natural for Casting?

Look how "Task-Forging" improved strength, reduced cost!

Once cast in steel, this front axle trunnion socket is now forged by COMMERCIAL on an 8" upsetter from 3¾" diameter SAE 1040 bar stock. Result: Costly excess machining and waste stock is eliminated by internal and external displacement of metal to only the points where it is needed for greatest efficiency.

Notice the open rectangular end, the angularity at the open belled end, the increased metal thickness at the bosses, and their eccentric center line position. Such an odd shape is seldom considered as an upset forging, yet to the COMMERCIAL "Task-Forging" team, with years-ahead pioneering in specialized techniques and equipment, upsetting the large stock displacement to + 0, −1/16" internally and + 1/16", −0 externally was routine.

The improved strength and efficiency of this part is a direct contribution of COMMERCIAL "Task-Forging"... a complete service offering research, testing and design assistance to manufacturers seeking stronger, more compact component parts at less cost. Backed by modern, highly advanced upsetting facilities, the COMMERCIAL "Task-Forging" team is producing unusually complicated shapes with flexibility closely approaching the casting process while retaining the inherent strength and material integrity of forgings.

Please feel free to avail yourself of COMMERCIAL's "Task-Forging" service, without obligation. Just send a blueprint or sketch of your unusual or difficult part... existing or planned. With 30 years of specialization in "tough" metal forming problems, and equipment "designed-by-experience" to handle them, COMMERCIAL engineers may well be able to help you. Write to Commercial Shearing & Stamping Company, Dept [illegible] Youngstown 1, Ohio.

COMMERCIAL
shearing & stamping

ANOTHER **GOODYEAR DISTRIBUTOR** FOLLOWS THROUGH!

Extends slurry-line life by 24 times

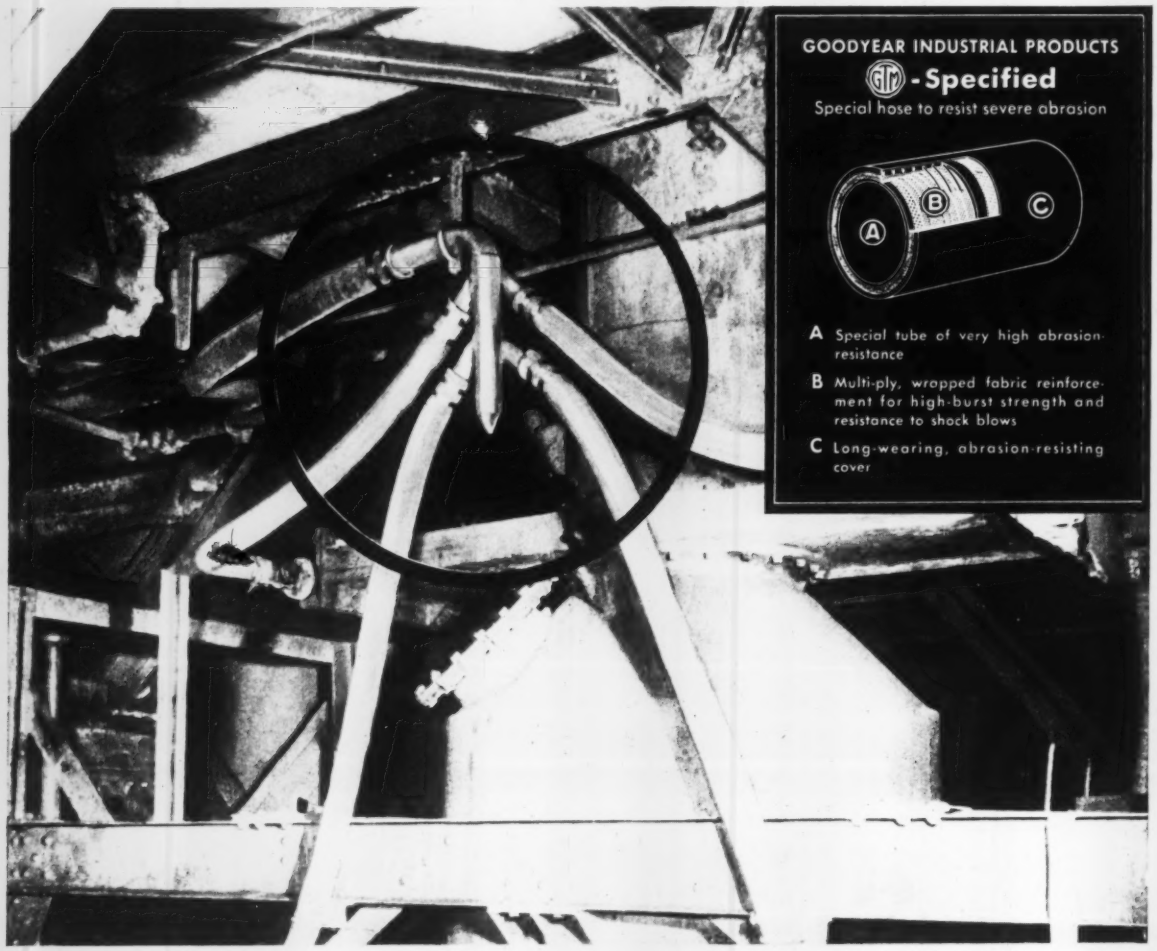
A Goodyear Distributor and a G.T.M. – Goodyear Technical Man – are quite a team. When they get together, tough problems fade – fast.

Take the trouble with the coal-dust slurry line at this Pennsylvania coal-cleaning plant. Even the heaviest steel pipe was quickly eaten through. In fact, 71 days was the longest service. Then there'd be another shut-down – another expensive replacement.

But that was before the Goodyear Distributor-G.T.M. team took over. Their suggestion: a special abrasion-fighting hose, engineered for just such operations. Result: that hose has done the job for more than 4 years at last report – has outperformed the heavy pipe 24 times over.

And that's typical. Time after time – in plant after plant – the Goodyear team has proved that years of trouble-free service is only a matter of the *right* recommendation of the *right* industrial product.

So next time you have a profit-eating situation like this, check it with your Goodyear Distributor and his G.T.M. You'll find them listed under "Rubber Products" or "Rubber Goods" in the Yellow Pages. Or you can write Goodyear, Industrial Products Division, Akron 16, Ohio.


GOODYEAR INDUSTRIAL PRODUCTS
GTM - Specified
Special hose to resist severe abrasion
A
B
C
A Special tube of very high abrasion-resistance
B Multi-ply, wrapped fabric reinforcement for high-burst strength and resistance to shock blows
C Long-wearing, abrasion-resisting cover

GOODYEAR

THE GREATEST NAME IN RUBBER

Dies or Dais?

Austin Brant, one of our technical writers and the editor who handles our new products department, gets lots of interesting mail. One news

release started: "A new barrel finishing media designed for diecastings. . ." This photo accompanied the release.

Unless the ornamental canopy over the throne is part of a diecast dais, we're at a loss to explain the picture. Maybe the people were invited to a dress ball to celebrate the media's introduction. In the murky upper foreground, you'll see the outlines of a TV camera and light stands. The release mentioned "media" and said "has been announced," so the art could be fitting.

The mails are filled with similar material. Have you ever received any? When you get some, how about dropping it in the mail to us. We prefer that it be about metalworking. Please don't expect us to acknowledge receiving it, but we may print it.

We Thank You, Sir

Louis Polk Jr., Sheffield Corp., subsidiary of Bendix Aviation Corp., Dayton, Ohio, writes: "The survey in STEEL, July 13, p. 56, 'Metalworking's Capital Equipment Outlays—The Boom Begins,' certainly should be helpful to people in our industry. In most surveys, there has not been enough detailed breakdown to be of real value to a company attempting to forecast sales. Thank you for providing our management with another helpful forecasting yardstick."

This week's article in the series is about spending for joining and assembly. It will be followed in subsequent issues by articles about heat treating, testing and inspection, foundry, and cleaning and finishing. Reprints of the articles will be available until our supply is exhausted. If you'd like copies, just write to STEEL Editorial Service, Penton Bdg., Cleveland 13, Ohio.

You're Damned if You Do . . .

This squib came in as a news release. It was composed by Forrest H. Kirkpatrick, assistant to the president, Wheeling Steel Corp., Wheeling, W. Va.

The Staff Man

If he's usually in the office—
He should get out more often.
If he's out when you call—
He isn't on the job.
If he's at home nights—
He's neglecting outside contacts.
If he isn't at home nights—
He's wasting his time on frivolous things.
If he talks on a subject—
He's trying to run things.
If he's silent—
He has lost interest.
If he agrees with you—
He lacks originality or conviction.
If he doesn't agree with you—
He's ignorant.
If he's too busy for casual talk—
His job has gone to his head.
If he engages in casual talk—
That's all he has to do.
If he can't give you an immediate answer—
He's incompetent.
If he can give you an immediate answer—
He doesn't think things through.
If he appears cordial—
He's playing politics.
If he appears aloof—
He should be trimmed down to size.
If he has a strong opinion
He's bullheaded.
If he tries to see both sides of a question—
He's pussyfooting.
If he's on the job a short time—
He lacks experience.
If he has been on the job a long time—
He's in a rut.
If he's well dressed—
He thinks he's a big shot.
If he isn't well dressed—
He's not a proper representative.
If he takes a vacation—
He's been on one all year . . .

How Long Will It Last?

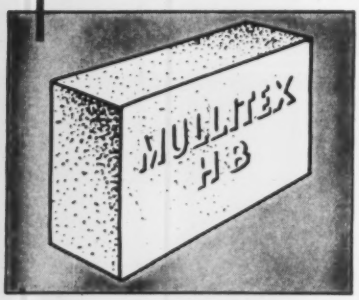
STEEL's editorial staff, fully aware of the seriousness of any strike, has set up a pool, in which contestants wager a thin, nonferrous coin, on the number of days steel mills will be struck. The average guess was 27½ days, the mean,

Walsh Points the Way...
TOWARD A NEW HORIZON in REFRACTORY Performance

AN OPEN LETTER TO THE STEEL INDUSTRY

...consistent with refractory quality, Walsh is constantly striving to produce fire brick of higher bulk density and lower porosity. To you this is assurance of greater dollar value when you purchase refractories by Walsh.

Specialists in fire brick of high bulk density and low porosity.



WALSH REFRACTORIES CORPORATION
101 FERRY STREET • ST. LOUIS 7, MO.
FOR OVER 60 YEARS MANUFACTURERS OF HIGH GRADE REFRACTORIES

29. The extremes went from zero to 56 days. The zero betters hedged a trifle. There were five who didn't follow their beliefs. The next highest, after the zero betters, was a guy who said seven days. Quite a bit of leeway. Guesses of the biggest grouping, six staffers, ranged from 42 to 46 days.

All of which proves that most of the staff followed STEEL's original prediction—barring intervention from the government—that the steel strike could last six to nine weeks.

You Can't Eat This One

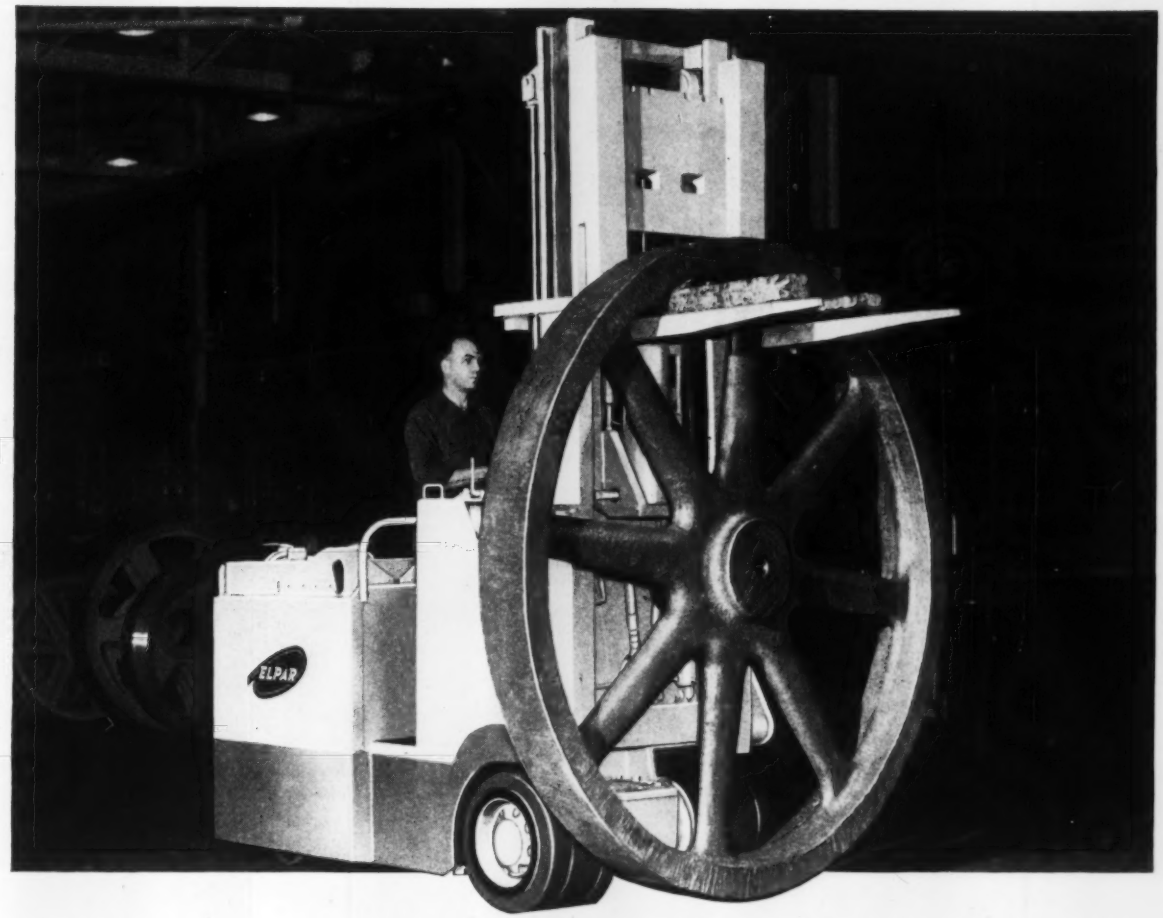
We've heard of construction men's hard hats and military helmets, but here's the latest, a fashionable metallic headgear for the male. Black and brown fedoras, marketed by John B. Stetson Co., Philadelphia, feature flecks of Reynolds Metals Co.'s aluminum yarn. This black version sports silver touches and the brown copy has gold colored yarn.

Just think, it won't rust!

Electromachining—What's Going On?

Next week, Machine Tool Editor Bob Huber will take you below the surface of this extraordinary machining process. The odd shaped guide fixture in the picture is holding an electrode in an agitating dielectric. Immersed in the fluid is a workpiece being cut by electrospark machining.

The process was born in laboratories, nurtured in toolrooms, and is starting to grow in production. It tackled carbides and has gone to work on steel alloys. The next step—back into the toolrooms to make dies.



ELPAR'S New TITAN

. . . first BIG TRUCK with small truck maneuverability

No other truck in the 12,000 to 20,000 lb. capacity range can match the new TITAN for maneuverability. Built to operate through box car doors, the TITAN is ideal for car loading and for handling in narrow or congested aisles.

Other important features include:

TRI-SAFE BRAKING—an ELPAR safety exclusive that provides three independent braking systems operated by a single toe bar.

FASTER SPEEDS — fast lift and travel speeds plus rapid acceleration mean greater working efficiency.

UNEXCELLED VISION—elimination of bulky linkage gives the operator a clear view between the uprights.

As easy to operate as the family car, the new TITAN is the product of ELPAR's more than 50 years of industrial truck building experience. Compare features and you'll be convinced the TITAN is the best heavy duty fork truck buy!

5 models — 12,000 to 20,000 lbs. capacity

Send for this new TITAN folder —

ELPAR

ELECTRIC TRUCKS

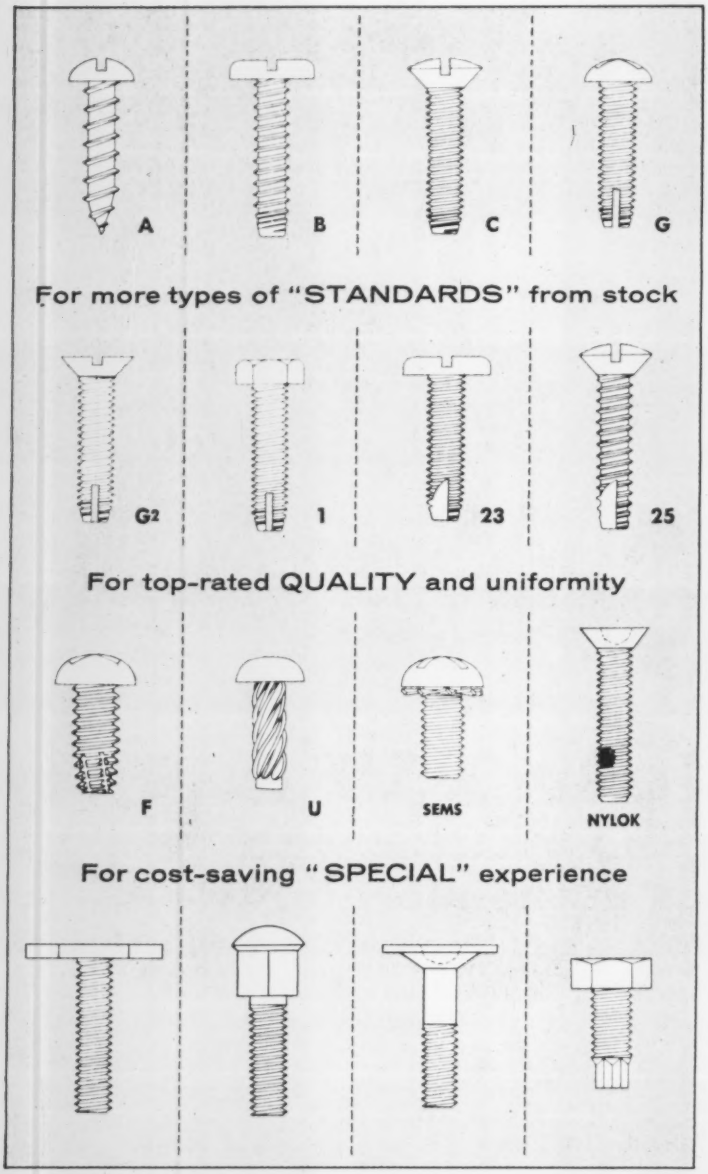
THE **ELWELL-PARKER** ELECTRIC COMPANY
4101 ST. CLAIR AVENUE • CLEVELAND 3, OHIO
In Canada: International Equipment Company, Ltd.

TWICE THE LIFE . . . ONE-THIRD THE OPERATING COST

Count on *Continental* to show you why

you can measure the difference in assembly dollars

when you use the right type for the job



Which fasteners will serve best and save most in your assemblies? Many types of screws look much alike, but the difference between the right and wrong choice for your job can often make a big difference in assembly costs.

Since Continental makes and supplies *all* types, their recommendations are unbiased. They can tell you if you should be using some "standard" you have overlooked. Or, if a "special" will save you most, you can rely on Continental's specialized experience to design and produce it at the lowest possible cost.

CHECK YOUR ASSEMBLIES

Find out where Continental's cost-saving ideas can cut your assembly costs. Talk to a Continental Assembly Specialist. For prompt service, write or phone: Continental Screw Co., 462 Mt. Pleasant St., New Bedford, Mass.

MEMBER
SCREW RESEARCH ASSOCIATION

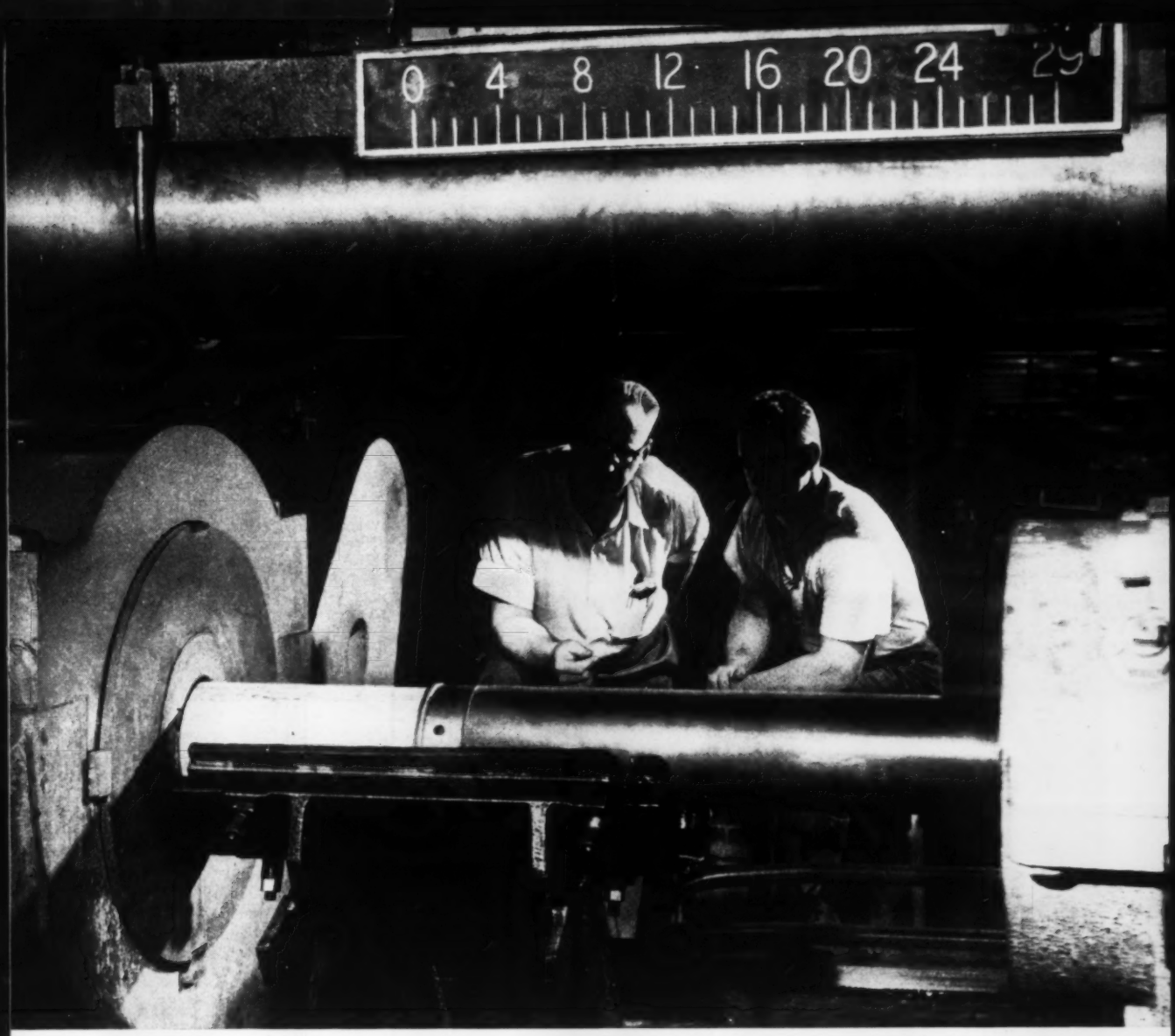
CONTINENTAL

SCREW COMPANY, NEW BEDFORD, MASS.

HOLTITE FASTENERS

HY-PRO TOOL COMPANY... DIVISION
RESEARCH ENG. & MFG., INC. SUBSIDIARY

HOLTITE PHILLIPS AND SLOTTED HEAD
WOOD • MACHINE • TAPPING
THREAD CUTTING •
HANGER AND STOVE BOLTS •
SEMS • NYLOK
HY-PRO PHILLIPS INSERT BITS AND HOLDERS



Why ALCAN extrusion ingot "runs" easier... faster... more economically!

How much difference would better quality billet make in your extruding costs and productivity? *A substantial difference* . . . if the billet you switch to is ALCAN!

For you will find that ALCAN billet offers you every fabricating advantage. It pushes easier, faster. It gives you longer die-life . . . less scrap . . . and better quality of finished product. All good reasons why a trial run can prove to you that this is the most economical billet you can use!

From mining to casting—countless checks on quality make ALCAN the finest of all billet products. It is made entirely of clean, primary metal . . . unexcelled in internal structure and surface smoothness . . . and cast to the industry's closest tolerances.

Telephone us today about testing ALCAN billet on your own equipment! We welcome the opportunity to show you the difference it can make in your extruding costs and productivity.

Aluminium
Limited

Ingot Specialist...serving
American Aluminum Fabricators—

In the U. S.—Aluminium Limited Sales, Inc., 630 Fifth Avenue, N.Y. 20, N.Y.
CLEVELAND • CHICAGO • LOS ANGELES • DETROIT • ATLANTA • ST. LOUIS

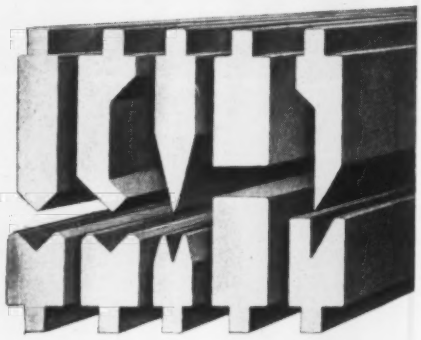
Additional distribution (Alcan Foundry Alloys):
Apex Smelting Company, Chicago, Cleveland, Los Angeles
Charles Batchelder Co., Inc., Botsford, Conn.

ALABAMA
Birmingham
Hinkle Supply Co., Inc.—FAirfax 2-4541
CALIFORNIA
Los Angeles
Meyer Sheet Metal Mchry. Co.—VAn Dyke 1477
San Francisco
Harron, Rickard & McCone Co.—ATwater 2-2202
GEORGIA
Atlanta
Allison Mchry. Co.—JAckson 4-1741
INDIANA
Indianapolis
E. L. Humston Co., Inc.—WAlnut 5-9691
IOWA
Bonaparte
Corry's Machine & Tool Co.—Phone: 112
KANSAS
Wichita
Ellfeldt Mchry. & Supply Co.—AMherst 7-9773
MASSACHUSETTS
Cambridge
Austin-Hastings Co., Inc.—KIrkland 7-4480
MICHIGAN
Detroit
J. Lee Hackett Co.—TRinity 2-6442
MINNESOTA
Minneapolis
Minnesota Steel & Mchry. Co.—FEderal 3-6273
MISSOURI
Kansas City
Ellfeldt Mchry. & Supply Co.—VIctor 2-5494
NEW YORK
New York
Federal Machinery Corp.—CAnal 6-3022
Triplex Machine Tool Corp.—EMpire 1-1700
H. Weiss & Co.—CAnal 6-4256
NORTH CAROLINA
Greensboro
Armentrout Mchry. Co.—Phone: 4-8218
OHIO
Columbus
Vorys Brothers, Inc.—AXminster 4-4701
OKLAHOMA
Oklahoma City
Hart Industrial Supply Co.—REgent 9-2541
Tulsa
Hart Industrial Supply Co.—LUther 3-2175
OREGON
Portland
Pacific Metal Co.—CApitol 7-0693
PENNSYLVANIA
Philadelphia
Delaware Valley Mchry., Inc.—OLdfield 9-4600
Milton Equipment Co.—WAlnut 2-1734
Pittsburgh
Wm. K. Stamets Co.—ATlantic 1-8091
TEXAS
Dallas
Briggs-Weaver Mchry. Co.—LAkeside 8-0311
Fort Worth
Briggs-Weaver Mchry. Co.—EDison 6-5621
Houston
Mehl Machinery, Inc.—FAirfax 3-1313
WASHINGTON
Seattle
Pacific Metal Co.—MAin 6925
WISCONSIN
Milwaukee
Production Equip. Inc.—GReenfield 6-6075

CANADA
A. R. Williams Machinery Co., Ltd.
ALBERTA
Calgary—Phone: 5-4425
Edmonton—Phone: 24341
BRITISH COLUMBIA
Vancouver—TAtlow 9411
Victoria—Phone: 4-7623
MANITOBA
Winnipeg—SPruce 4-4458
NOVA SCOTIA
Halifax—Phone: 5-4389
ONTARIO
Hamilton—JAckson 9-5388
Ottawa—CEntral 6-3661
Toronto—EMpire 4-2381
Windsor—CLearwater 4-4762
QUEBEC
Montreal—RIverside 8-9381

8925

Off-the-shelf DELIVERY



CHICAGO®
*Induction Hardened**
PRESS BRAKE DIES

This organization of local distributors offers immediate delivery on many CHICAGO *induction hardened* press brake dies. These stock dies are economical, and the quick delivery saves time in tooling. They are available in any length from 4 to 12 feet in increments of 2 feet.

Stock dies are used for a surprisingly large variety of bending operations. And, with CHICAGO *induction hardened* dies you get bonus performance and increased die life at no extra cost. Remember, these dies can be used in any make or size of standard press brake.

On your needs for press brake dies, call your nearest distributor listed here. With Bulletin D-457 you can order by number. Ask for a copy.

*Induction hardening is a special, high-frequency process used to harden the wear surfaces of CHICAGO dies. Field reports on CHICAGO *induction hardened* dies show up to ten times longer life than conventional press brake dies.

CHICAGO DREIS & KRUMP

Press Brakes, Press Brake Dies
Straight-Side-Type Presses

Hand and Power Bending Brakes
Special Metal-Forming Machines

DREIS & KRUMP
MANUFACTURING CO.
7458 South Loomis Boulevard
Chicago 36, Illinois

CALENDAR
OF MEETINGS

Aug. 18-21 **Western Electronic Show and Convention:** Cow Palace, San Francisco. Information: WESCON, 1435 S. La Cienega Blvd., Los Angeles 35, Calif.

Aug. 19-29, **National Screw Machine Products Association:** Sales conference, Wade Park Manor Hotel, Cleveland. Association's address: 2860 E. 130th St., Cleveland 20, Ohio. Executive vice president: Orrin B. Werntz.

Aug. 31-Sept. 2, **Metallurgical Society of AIME:** Institute of Metals Division's conference on semiconductors, Statler-Hilton Hotel, Boston. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: R. W. Shearman.

Sept. 13-17, **Pressed Metal Institute:** Annual meeting, Stanley Hotel, Estes Park, Colo. Institute's address: 3673 Lee Rd., Cleveland 20, Ohio. Managing director: Harold A. Daschner.

Sept. 13-18, **American Chemical Society:** Fall meeting, Convention Hall, Atlantic City, N. J. Society's address: 1155 16th St. N.W., Washington 6, D. C. Executive secretary: Alden H. Emery.

Sept. 14-17, **American Mining Congress:** Metal mining and industrial minerals convention, Denver. Congress' address: Ring Bldg., Washington 6, D. C. Executive vice president: Julian D. Conover.

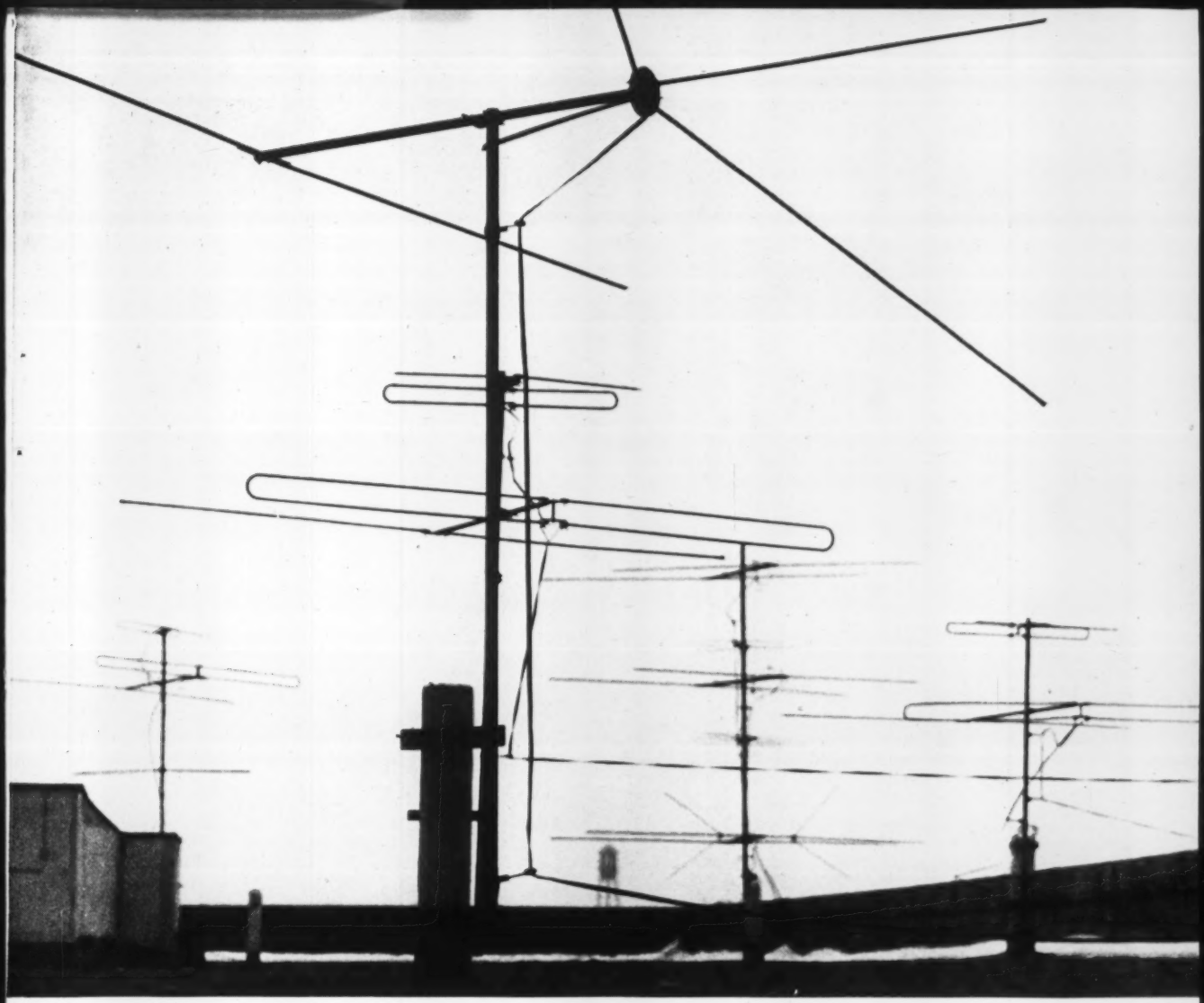
Sept. 14-17, **Society of Automotive Engineers:** National farm, construction and industrial machinery meeting, production forum, and display, Milwaukee Auditorium, Milwaukee. Society's address: 485 Lexington Ave., New York 17, N. Y. Secretary: John A. C. Warner.

Sept. 16-17, **American Die Casting Institute:** Annual meeting, Edgewater Beach Hotel, Chicago. Institute's address: 366 Madison Ave., New York 17, N. Y. Secretary: David Laine.

Sept. 16-18, **National Industrial Conference Board:** Marketing conference, Waldorf-Astoria Hotel, New York. Board's address: 460 Park Ave., New York 22, N. Y. Secretary: Herbert S. Briggs.

Sept. 17-18, **American Society of Mechanical Engineers:** Engineering management conference, Statler-Hilton Hotel, Los Angeles. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: O. B. Schier.

Sept. 18, **Malleable Founders' Society:** Industry meeting, Hotel Sheraton-Cleveland, Cleveland. Society's address: 781 Union Commerce Bldg., Cleveland 14, Ohio. Executive vice president: Lowell D. Ryan.



WHICH ONES WILL LAST (and last, and last!)?
THOSE MADE OF WEIRKOTE® ZINC-COATED STEEL!

Steel tubing that's protected against corrosion even under the most trying circumstances. Steel tubing that's easily fabricated to meet the most exacting specifications.

That's what you get in tubing made of Weirkote zinc-coated steel!

Weirkote's zinc coating—applied by the continuous process throughout, and so uniformly that every square inch is protected—is skin-tight. There's absolutely no flaking or peeling no matter how tortuous the crimping, twisting or other stresses of fabrication. In fact, Weirkote can be worked to the very limits of the steel itself.

The use of Weirkote can eliminate the need for any further coating process after fabrication. Its tight zinc coating is completely intact and remains so during fabrication and on the job. Weirkote zinc-coated steel tubing is particularly suited for jobs where weather is a factor to be taken into consideration.

Take a good long look at the possibilities and advantages of using Weirkote zinc-coated steel to meet your tubing requirements. For the complete story on Weirkote and how it can help you, write Weirton Steel Company, Dept. B-7, Weirton, West Virginia.

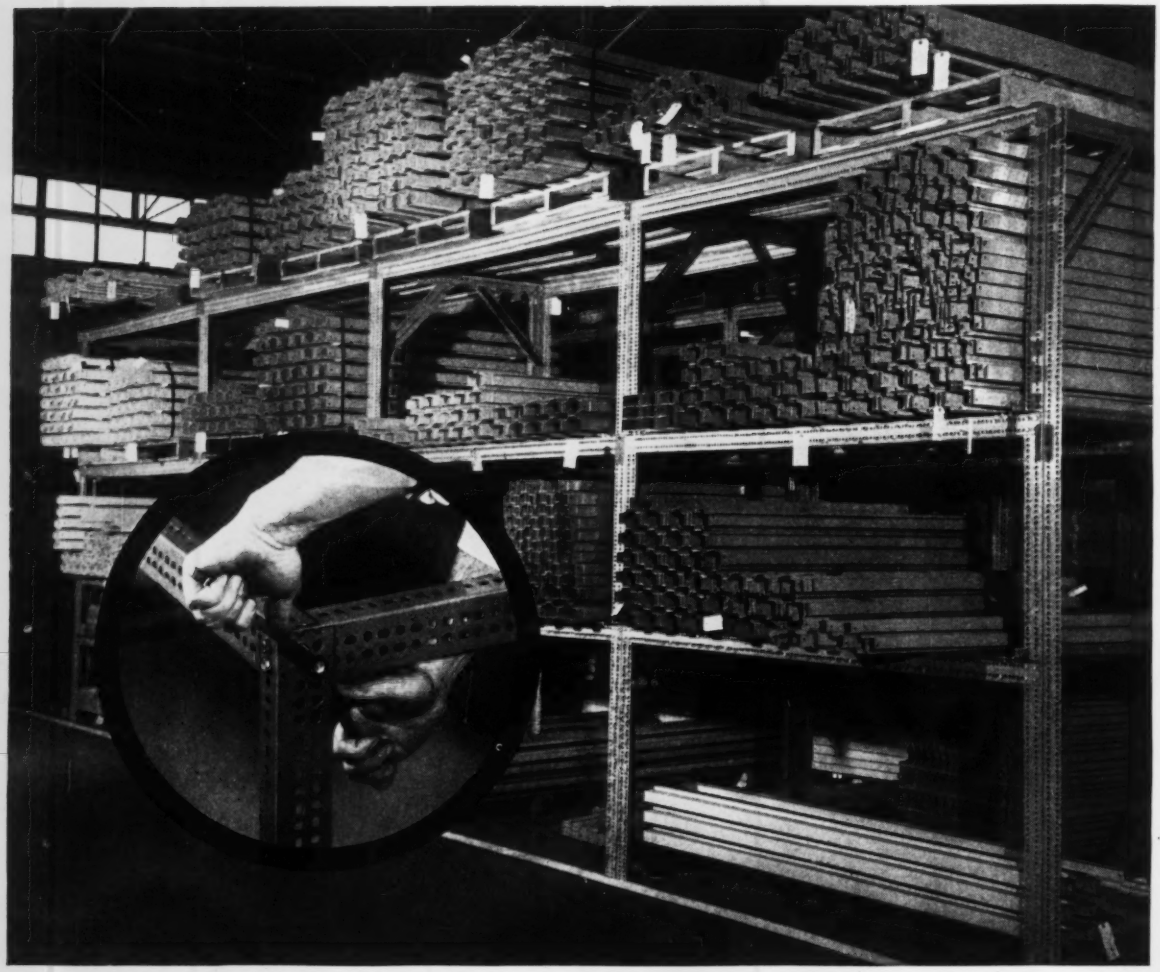
WEIRTON STEEL COMPANY

WEIRTON STEEL COMPANY

WEIRTON, WEST VIRGINIA

a division of

NATIONAL STEEL CORPORATION



REPUBLIC MATERIALS HANDLING EQUIPMENT saves time at Signode Steel Strapping Company, Glenview, Illinois. At Signode, Republic Stacking Boxes are filled with finished parts, stacked high for production assembly or shipment. Stacking does not damage the boxes. Heavy-duty stacking brackets and corrugated box construction deliver long, efficient service at low per-year cost. Send for information.

REPUBLIC STEEL PALLET RACKS save space, simplify palletizing, stacking of bulky, uneven, odd-lot, and fragile materials. Tubular steel supports adjust every six inches to handle material to any height. Two-way entry permits loading and unloading from either side. Write today.

Republic METAL LUMBER

..."imagineering" in steel framing assemblies

Republic METAL LUMBER® is the answer to erecting fast, economical, framing assemblies. It is as easy to use as common lumber. Yet, stronger . . . because it is heavy gage steel.

METAL LUMBER is engineered with a scientifically designed pattern of slots arranged on ¼" centers. Even complicated framing problems are easy because this unique system of short longitudinal and transverse slots makes possible an unlimited number of straight and angular assembly combinations.

METAL LUMBER is ideal for erecting storage racks, work benches, catwalks, ramps, ladders, and other framing assemblies tailored to your particular needs.

METAL LUMBER is fabricated at Republic's Berger Division. Made of heavy gage steel for maximum strength and rigidity. Bonderized after fabrication. Finished in gray baked-on enamel. Available in packages of convenient lengths, and in two heavy gages. Delivered complete with bolts and nuts for assembly.

METAL LUMBER is never obsolete. Its cut-and-join simplicity makes quick assembly possible with unskilled labor. When one setup is no longer needed, it can be torn down and converted into a new and useful unit. No scrap loss—even the smallest piece can be used as a cleat or splice.

Republic METAL LUMBER provides complete flexibility for your "imagineering." Simply plan, cut, and assemble. An attractive 20-page brochure tells you how.

CALL YOUR REPUBLIC REPRESENTATIVE, OR WRITE...

REPUBLIC STEEL CORPORATION
DEPT. ST-8163
1440 REPUBLIC BUILDING • CLEVELAND 1, OHIO

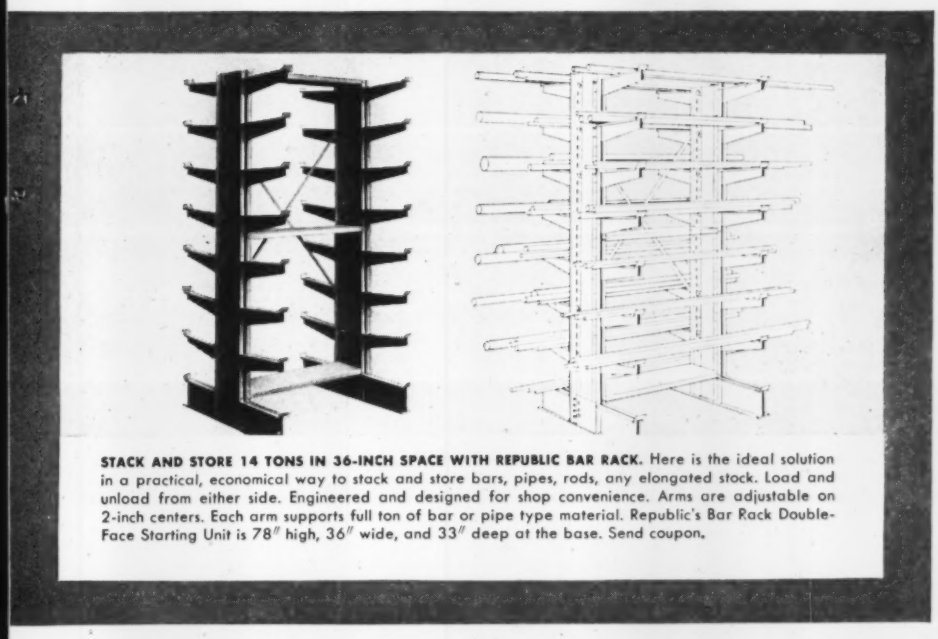
Please send information on the following Republic products:
☐ Republic METAL LUMBER brochure ☐ Republic Steel Pallets
☐ Materials Handling Equipment ☐ Republic Bar Rack
☐ Have a Republic-Berger Materials Handling Engineer call

Name_____ Title_____

Company_____

Address_____

City_____ Zone____ State_____



STACK AND STORE 14 TONS IN 36-INCH SPACE WITH REPUBLIC BAR RACK. Here is the ideal solution in a practical, economical way to stack and store bars, pipes, rods, any elongated stock. Load and unload from either side. Engineered and designed for shop convenience. Arms are adjustable on 2-inch centers. Each arm supports full ton of bar or pipe type material. Republic's Bar Rack Double-Face Starting Unit is 78" high, 36" wide, and 33" deep at the base. Send coupon.

REPUBLIC STEEL

World's Widest Range of Standard Steels and Steel Products

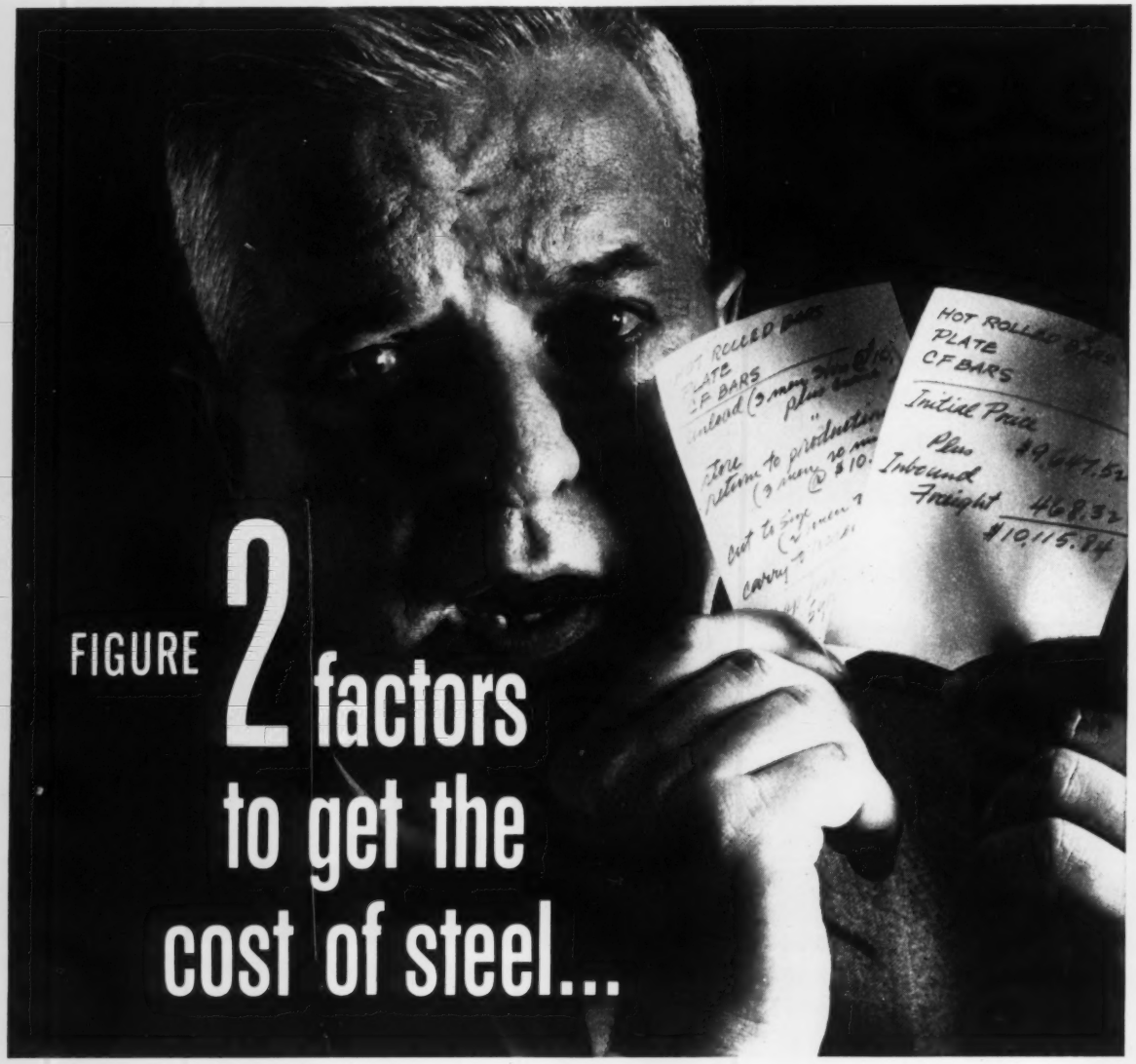


FIGURE 2 factors to get the cost of steel...

Initial price! And COST OF POSSESSION!

If you're putting steel in inventory for later use because you think it's a bargain, compare all your costs, including cost of possession, with the price and *freedom from risk* of buying from your Steel Service Center.

Many steel users have found that using Service Center steel saves expensive storage space and saves the costs of obsolescence, waste, handling and cutting.

When you use Steel Service Center labor and equipment for preliminary processing, you save both the investment and operating expense of having your own labor and equipment.

Use the chart to figure all your costs. For more information, get the booklet, *What's Your Real Cost of Possession for Steel?* Ask your nearby Steel Service Center. Or write to American Steel Warehouse Association, Inc., 540-G Terminal Tower, Cleveland 13, Ohio.

COST OF POSSESSION FOR STEEL IN YOUR INVENTORY

Per ton delivered	
Cost of capital:	
Inventory	
Space	
Equipment	
Cost of operation:	
Space	
Materials handling	
Cutting & burning	
Scrap & wastage	
Other costs:	
Obsolescence	
Insurance	
Taxes	
Accounting	
TOTAL	

COST OF FREEDOM-FROM-RISK STEEL FROM YOUR STEEL SERVICE CENTER

Per ton, cut-to-size, and delivered

TOTAL

AMERICAN STEEL WAREHOUSE ASS'N

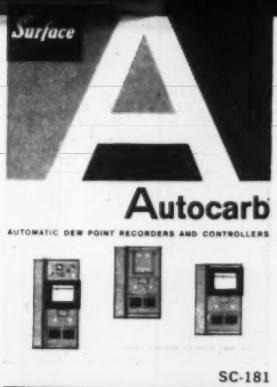
The American Steel Warehouse

...YOUR STEEL SERVICE CENTER

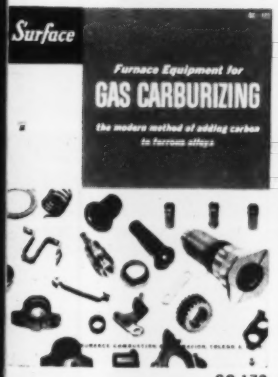
WHAT'S NEW

IN HEAT TREATING?

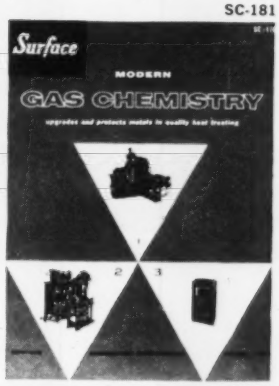
this library of technical information is yours for the asking



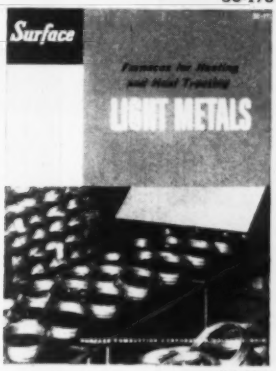
SC-181



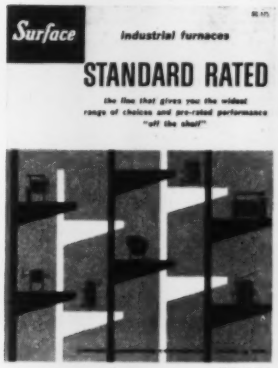
SC-172



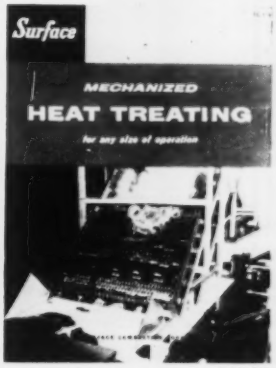
SC-178



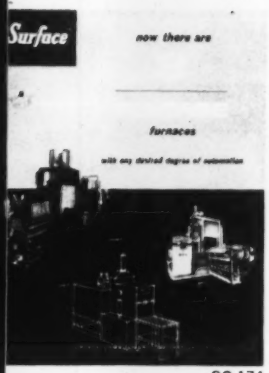
SC-171



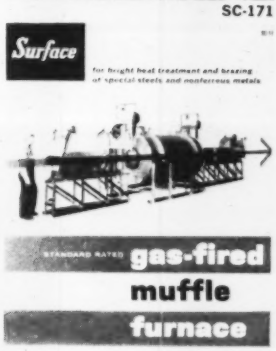
SC-175



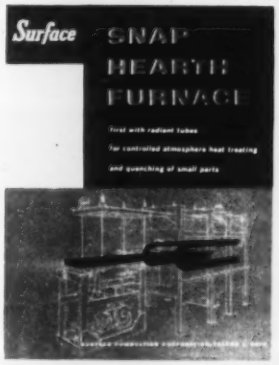
SC-176



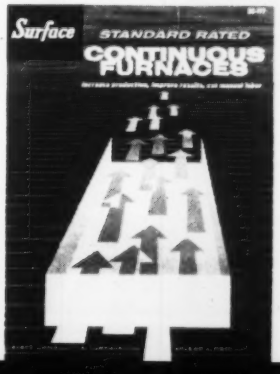
SC-174



SC-179



SC-173



SC-177

SURFACE COMBUSTION CORPORATION

2385 Dorr Street, Toledo 1, Ohio

☐ Have Sales Engineer call ☐ Send Bulletins checked

☐ SC-171 ☐ SC-173 ☐ SC-175 ☐ SC-177 ☐ SC-179

☐ SC-172 ☐ SC-174 ☐ SC-176 ☐ SC-178 ☐ SC-181

name & title .....

company .....

street .....

city ..... zone ..... state .....

MUNDT

a name with over 83 years experience ready to serve the industry at all times with the

PERFORATED

requirements necessary for your equipment, machinery or parts in any form or types of

METAL

or fibre, cardboard, paper, soundboards and other materials in a workmanlike manner that

MEANS

lasting performance, better quality, and above all a product that will give you a

PERFECT

job for the particular purpose for which it is to be used, without defects, burrs or camber to

SCREENS

because our up-to-date equipment, plus our engineering counsel gives you nothing but the best.

Specially Fabricated for
ALL INDUSTRIES
BY
CHARLES MUNDT & SONS
53 FAIRMOUNT AVE.
JERSEY CITY 4, N. J.
PHONE—DELAWARE 3-6200
Send for Illustrated Catalog

STEEL
The Metalworking Weekly

Editor-in-Chief, IRWIN H. SUCH

Editor, WALTER J. CAMPBELL

Associate Managing Editors, VANCE BELL, JOHN S. MORGAN

WILLIAM M. ROONEY .....Market Editor
ROBERT F. HUBER .....Machine Tool Editor
HARRY CHANDLER .....Copy Editor
GLENN W. DIETRICH...Associate Copy Editor
FRANK R. BRIGGS .....Associate Editor
ROBERT O. JAYNES .....Associate Editor
AUSTIN E. BRANT .....Associate Editor
ROSS WHITEHEAD .....Associate Editor
GEORGE J. HOWICK .....Associate Editor
NEIL C. ROBERTS .....Associate Editor
DERRY EYNON .....Assistant Editor
DONALD E. HAMMERSTROM..Assistant Editor
JOHN TERESKO .....Assistant Editor
WILLIAM M. OLDS .....Assistant Editor
MARY T. BORGERHOFF .....Assistant Editor
MARY ALICE EARLY .....Assistant Editor
EILEEN CORTES .....Assistant Editor
MARY ANN STUVE .....Editorial Assistant

JANE WEDGE, Editorial Assistant

THOMAS H. BRYAN, TOM WELSH, Art Editors

IRENE KASNER, Editorial Service

Resident Editors

New York 17 .....60 E. 42nd St.
B. K. PRICE, L. E. BROWNE
BRIAN WILSON
Murray Hill 2-2581

Chicago 11 .....520 N. Michigan Ave.
ERLE F. ROSS, WILLIAM E. DEAN
Whitehall 4-1234

Pittsburgh 19 .....2837 Koppers Bldg.
WILLIAM V. WALLACE—Atlantic 1-3211

Detroit 35 .....15800 W. McNichols Rd.
A. DONALD POSTMA—Broadway 3-8150

Washington 4 ....1123 National Press Bldg.
JOHN R. BOTZUM—Executive 3-6849

Editorial Correspondents

Buffalo—Emerson 5385 ....GEORGE E. TOLES
Youngstown—Riverside 7-1471..GEO. R. REISS
Cincinnati—Beechmont 1-9607...DICK HAVLIN
Birmingham—Birmingham 3-1121 R. W. KINCEY
St. Louis—Garfield 1-1212 HAMILTON THORNTON
Houston—Hudson 6-5236 .....ROBERT SHIRK
Los Angeles—Webster 5-1234..NORMAN LYNN
San Francisco—Yukon 6-5151 EDWIN HAVERTY
Seattle—Melrose 2-1895 .....R. C. HILL
Toronto, Canada—Empire 4-9655..F. S. TOBIN
Birmingham, England .....J. A. HORTON
Brussels, Belgium .....PAUL DE KEYSER

Dusseldorf, Germany, DR. HERBERT GROSS

BUSINESS STAFF

Business Manager, D. C. KIEFER

Asst. Business Mgr.....C. A. TALLINGER JR.
Advertising Service Mgr. ...DORIS MITCHELL
Production Manager .....A. V. ANDERSON
Classified Advertising .....EVELYN DIETZ
Promotion Director .....S. F. MARINO
Market Research Mgr. ....T. M. BALLANTINE
Circulation Director .....J. C. GERNHARD
Distribution Manager .....G. R. EBERSOLE

Reprints, JUNE SCHILENS

Advertising Representatives

New York 17 .....60 E. 42nd St.
K. A. ZOLLNER, GUY LABAW
Murray Hill 2-2581

Wynnewood, Pa. (Phila.) 200 Wynnewood Ave.
WM. J. VERSCHOOR—Midway 2-6512

Farmington, Conn. .....12 Farmstead Lane
CALVIN FISHER JR.
Orchard 7-1756

E. Rochester, N. Y. .....217 Ridgeview Dr.
HAROLD A. DENNIS—Browning 1-2105

Pittsburgh 19 .....2837 Koppers Bldg.
J. C. SULLIVAN—Atlantic 1-3211

Cleveland 13 .....Penton Bldg.
J. K. GILLAM, N. W. MANNING—Main 1-8260

Cincinnati 6 .....2215 Victory Parkway
E. L. FRANKE—Parkway 1-0711

Detroit 35 .....15800 W. McNichols Rd.
DONALD C. HYDE
Broadway 3-8150

Chicago 11 .....520 N. Michigan Ave.
L. C. PELOTT, W. L. POLAND
WM. J. D'ALEXANDER, RICHARD BIRDSONG
Whitehall 4-1234

Los Angeles 36 .....5943 W. Colgate Ave.
F. J. FULLER—Webster 1-6865

San Francisco 4 .....57 Post St.
Robert W. Walker Co.—Sutter 1-5568

Griffin, Ga. .....1106 Pine Valley Rd.
FRED J. ALLEN—Griffin 7854

Clearwater, Fla. .....1954 Jeffords Dr.
H. G. ROWLAND—(Clearwater) 39-9493

Dallas 35 .....818 Exchange Bank Bldg.
JAMES H. CASH—Fleetwood 1-4523

BPA

NBP

Published Every Monday by
THE PENTON PUBLISHING CO., Penton Bldg., Cleveland 13, Ohio
MAin 1-8260

GEORGE O. HAYS .....Chairman
RUSSELL C. JAENKE .....President
FRANK G. STEINEBACH .....Vice President and Secretary
FRANK O. RICE .....Vice President
JOSEPH P. LIPKA .....Treasurer and Assistant Secretary

Also Publisher of
FOUNDRY, MACHINE DESIGN, NEW EQUIPMENT DIGEST, AUTOMATION
Member of Business Publications Audit of Circulation Inc., Society of Business Magazine Editors, and National Business Publications Inc.

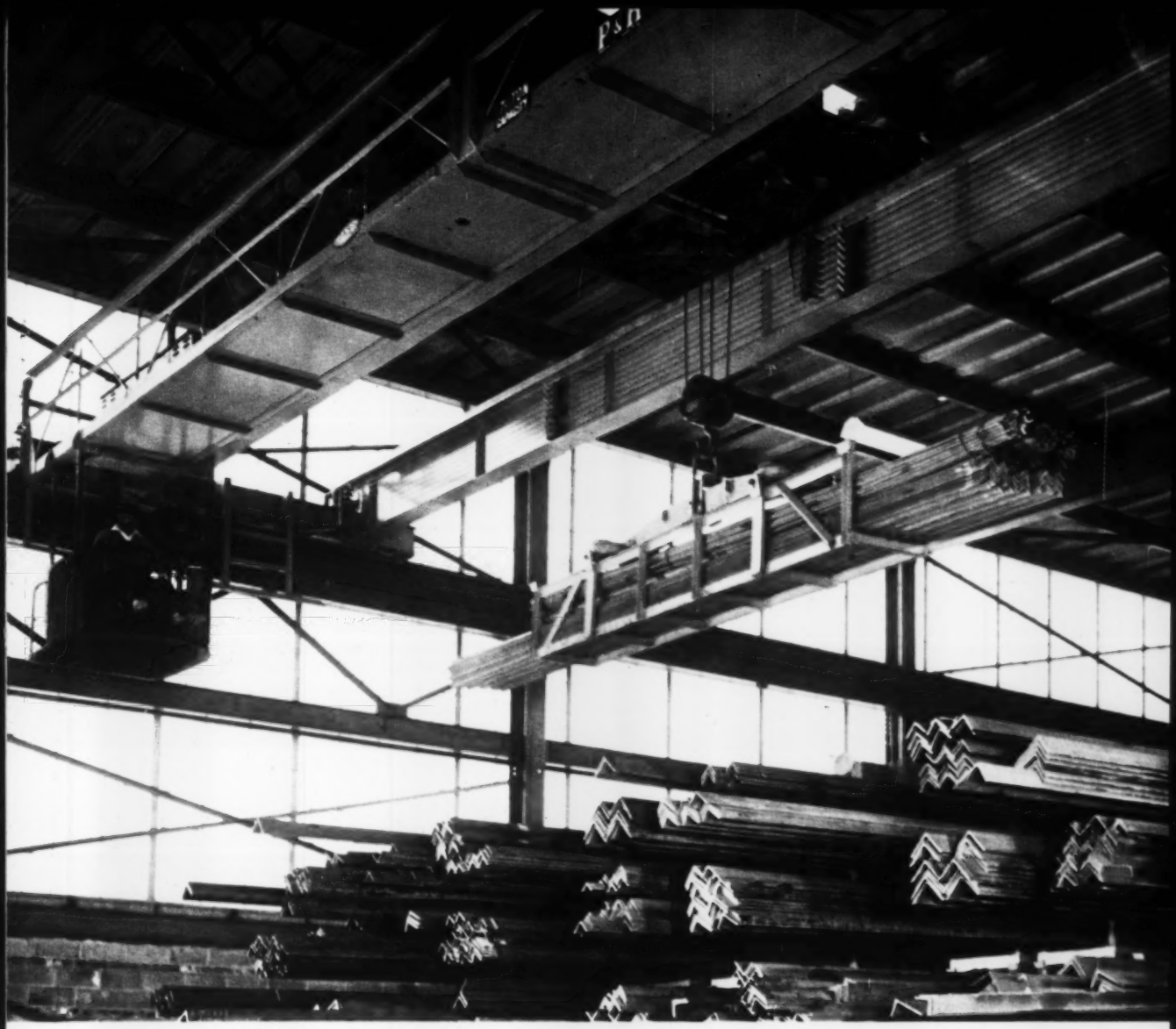


Photo Courtesy Simon Holland and Son Company, Inc., Brooklyn, N. Y.

FOR EVERY APPLICATION, THERE'S ONE CRANE OUTSTANDING...

IN METAL FABRICATION: Low-cost, 5-speed, standard-built P&H cranes provide quick, economical handling of a variety of steel shapes in this eastern fabrication shop. This 7½ ton unit has a 55 foot span, but by using I-beam construction, it furnishes fast thru-the-air steel handling with a minimum of dead weight imposed on the runway. This means that the inexpensive first cost is matched with low maintenance costs.

Built with all the care and craftsmanship found in *every* P&H crane, these units are heavyweights in performance, lightweight only in price, and are backed with the famous P&H guarantee of undivided responsibility on *all* structural, mechanical, and electrical parts. *Only* P&H gives you this assurance. Read the details in Bulletin C-51. Write for your free copy to Dept. 104, Harnischfeger Corp., Milwaukee 46, Wisconsin.

P&H

HARNISCHFEGER

...quality and service for 75 years

OUR 75TH YEAR

75

Photo Courtesy Waukesha Motor Company

...ON A DIME, GENTLY!

WHEN CLOSE SPOTTING IS THE NEED, P&H ZIP-LIFT IS THE STANDARD.

P&H Zip-Lift hoists excel in their ability to spot delicate loads on a dime, quickly — but gently. That's why you'll find Zip-Lifts aplenty . . . hanging over every vital lifting area . . . in this engine manufacturer's plant.

Why Zip-Lift?

First: Zip-Lift is *close-spotting*. Precision spotting of even awkward loads is done with the touch of a button. One hand control operation leaves other hand free to guide the load right to the spot.

Second: Zip-Lift *always works*. Its consistent dependability has been proven in tens of thousands of applications and under the toughest working conditions.

Third: Zip-Lift is *safe*. Workers are protected by a complete line of safety features including dual brakes, shrouded load block, low 24 volt control, and two limit switches that protect worker, load and hoist.

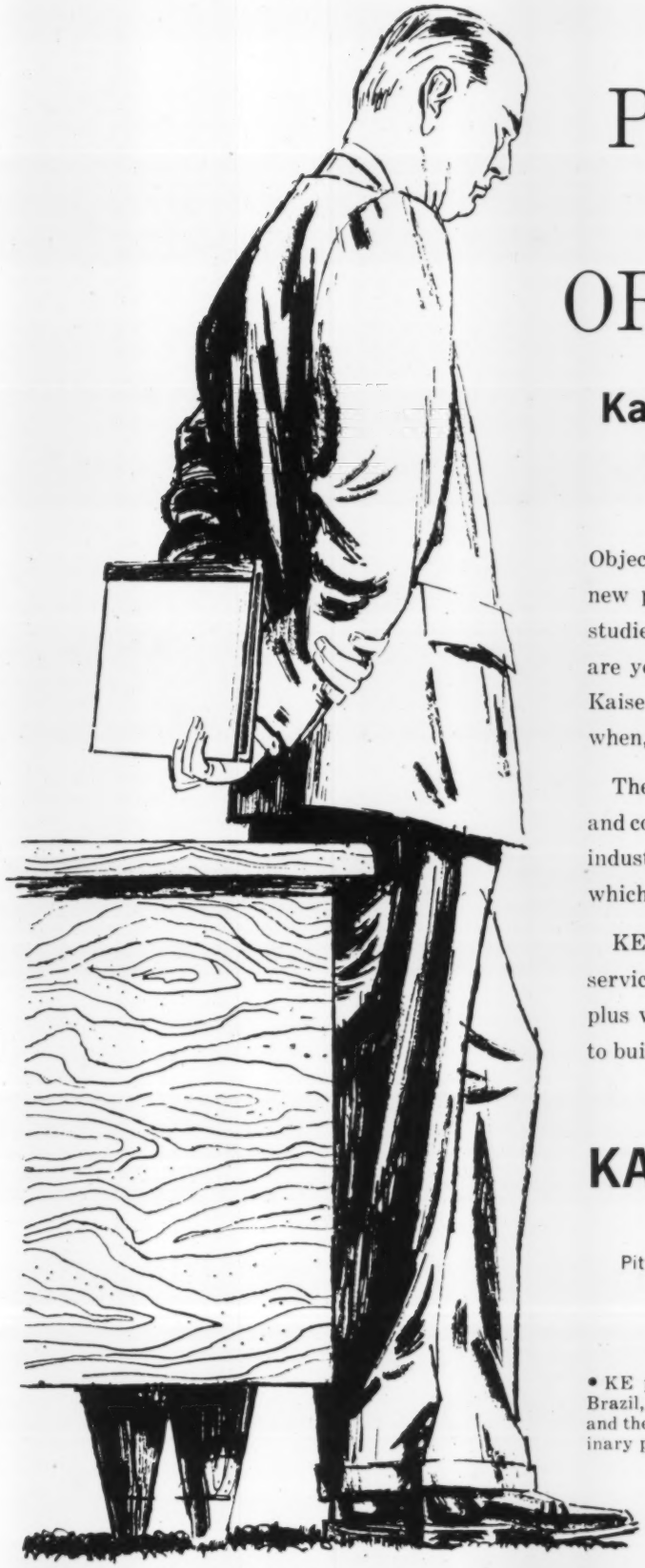
Best of all, Zip-Lift is *priced right* — at no sacrifice of quality.

The complete story on Zip-Lift is yours for the asking in Bulletin H-20. Write Dept. 204, Harnischfeger Corporation, Milwaukee 46, Wisconsin.

OUR 75TH YEAR

P&H HARNISCHFEGER

...quality and service for 75 years



PROCEED, DEFER OR MODIFY?

Kaiser Engineers can help you decide

Objective analysis is vital to sound decision on new plant or expansion projects. Feasibility studies, economic analyses and site evaluations are yours by an outside, impartial firm when Kaiser Engineers is selected to help you decide when, how and where to proceed.

These services are in addition to the design and construction of major facilities for the Steel industry—including the proven L-D Process for which KE is the U. S. licensor.

KE offers complete, one-company, integrated service from concept through construction—plus world-wide experience and the ingenuity to build quickly, within budget.

KAISER ENGINEERS

Division of Henry J. Kaiser Company
Oakland 12, California
Pittsburgh, Washington, D. C., Chicago, New York

• KE projects include work in Argentina, Australia, Brazil, Formosa, Japan, New Zealand, as well as Canada and the United States. Assignments range from preliminary planning to plant construction.

5458-S

Correct Lubrication in Action...

Fastener company cuts

Here some of the billions of fasteners produced by United-Carr Fastener Corporation undergo pickling bath before being plated. This company is a leader in the production of fasteners of all kinds for all industries.

Mobil

Complete Engineering Program
Proved Petroleum Products

Mobil

maintenance costs 40%

Here's how United-Carr Fastener Corporation saved over $37,000 with the help of Mobil Correct Lubrication!

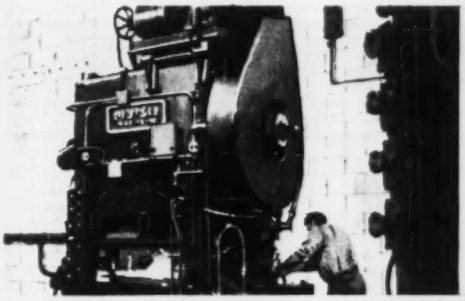
United-Carr Fastener Corporation manufactures thousands of types of metal fasteners, stampings, and plastic-to-metal components . . . brings out hundreds of new products every year. To maintain a competitive edge, costs must be kept to a bedrock minimum.

Records of the company's Carr Fastener Division show that along with capital improvements, a Mobil Program of Correct Lubrication helped lower maintenance costs per machine hour 40% last year. Overall savings during a period of over 3 years amount to $37,000.

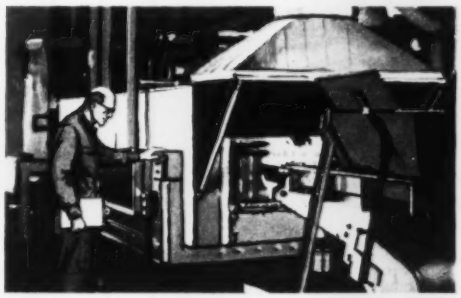
Mobil engineers and plant personnel studied savings possibilities. Maintenance schedules were carefully planned to cut machine servicing time. Mobil laboratory analyses of lubricants were helpful in solving downtime and severe-wear problems. Mobil recommendations for improvements in lubrication system helped lengthen machine life. In fact, machine downtime has been reduced to a point where maintenance crews no longer need to job out repairs but can handle them themselves.

This is *Correct Lubrication in Action.* Why accept less for your plant?

Clogged oil filters on high-speed presses caused constant shutdowns. Mobil studied lubrication system design—suggested improvements to keep lubricant and machines clean. Contamination was reduced . . . filter replacements cut 50% . . . $1,303 saved.



Bearings and gears on press drive units failed frequently. Mobil investigation indicated abnormal wear. Mobil recommended case-hardened gears and extreme-pressure lubricant. Gear and bearing life doubled . . . $19,934 saved in 31-month period.



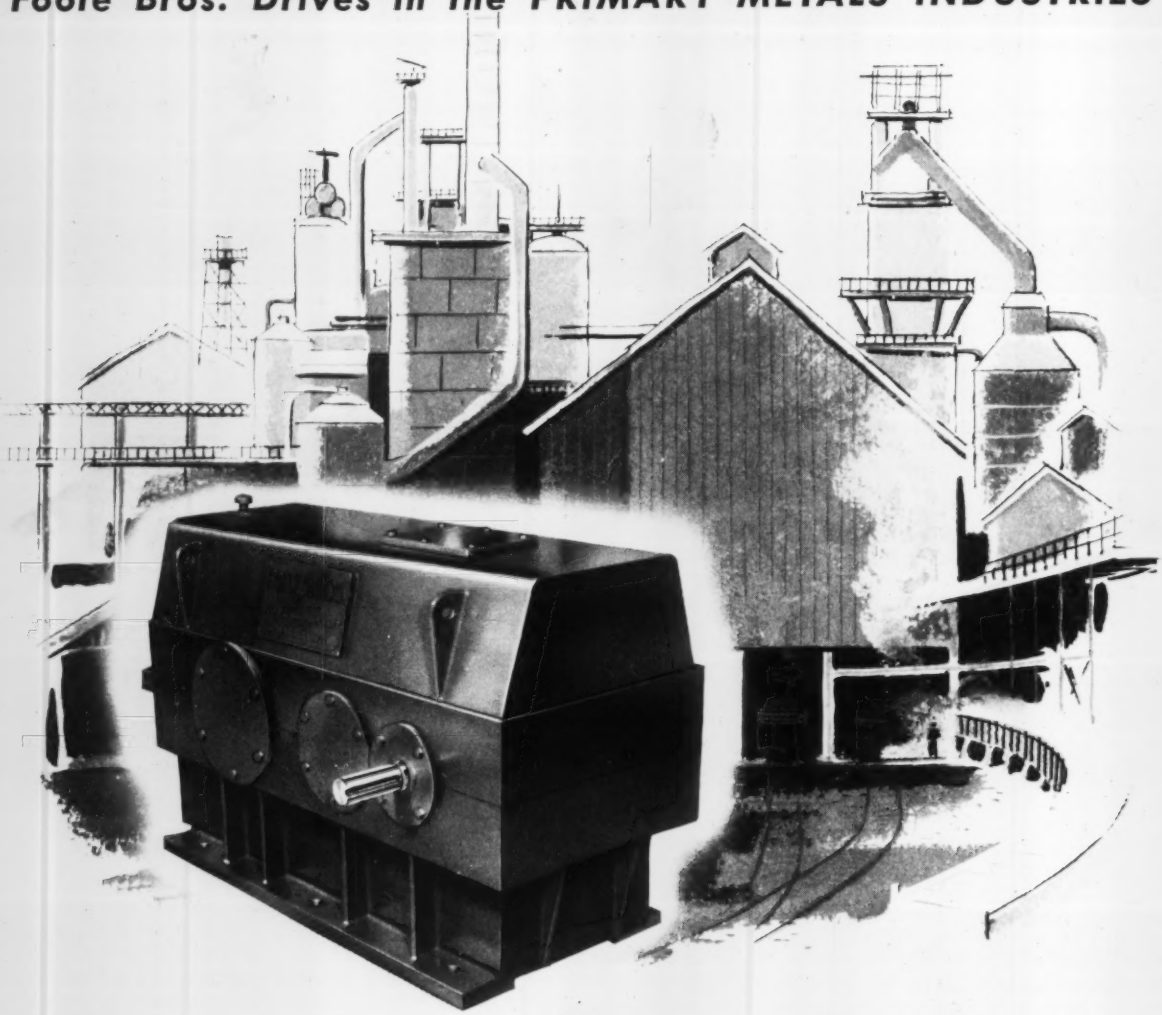
Due to high heat and heavy loads, conveyor belt bearings in drying ovens had to be replaced yearly. Mobil recommended a lubricant that cut this expensive time-consuming task—saved Carr Fastener $293 in 24 months.

Severe acid, alkali and wash conditions caused once-a-week bearing failure on tumblers. Mobil recommended more frequent application and inspection. Result—bearing failure almost completely eliminated . . . $4,376 saved in 39-week period.

Correct Lubrication

Another reason You're Miles Ahead with Mobil!

Foote Bros. Drives in the PRIMARY METALS INDUSTRIES



ALL STEEL Maxi-Power...

maximum performance drive in a tough steel housing

Add a functionally designed and carefully engineered, high strength fabricated steel housing to the basic heavy duty Maxi-Power Parallel Shaft Helical Gear Drive components, and you get a unit that is capable of resisting severe external impact, in addition to delivering maximum performance.

Maxi-Power Drives are found in the Primary Metals Industries wherever power demands are heavy, and operating conditions require the ultimate in strength, stamina and efficiency.

The heavy, precision machined steel bed of these drives keeps broad faced helical gearing in precise alignment to provide a smooth, overlapping mesh with close backlash tolerances. Tooth deflection is uniform under the heaviest loads. Heavy duty anti-friction bearings are conservatively rated to handle severest shock loads.

Maxi-Power Drives are available in nine combinations of shaft assemblies to permit a variety of gear drive arrangements between the prime mover and driven equipment. Maxi-Power Drives are available in Single, Double, and Triple Reductions. Standard Ratios are from 2.08 to 1 and up to 360 to 1. Capacities to 1550 HP.

Why not get the complete story on Maxi-Power soon? Write for Engineering Manual MPB and full details on the All Steel Drive today.

100 YEARS SERVING INDUSTRY 1859-1959

FOOTE BROS.

Better Power Transmission Through Better Gears

Find Your Nearest Distributor In The 'Yellow Pages'

FOOTE BROS. GEAR AND MACHINE CORPORATION • 4583 S. WESTERN BOULEVARD • CHICAGO 9, ILLINOIS

Roebling Hose Reinforcing Wire... The best things come in no-charge packages

When you buy Roebling Hose Reinforcing Wire it is delivered to you on no-charge spools that mean savings to you.

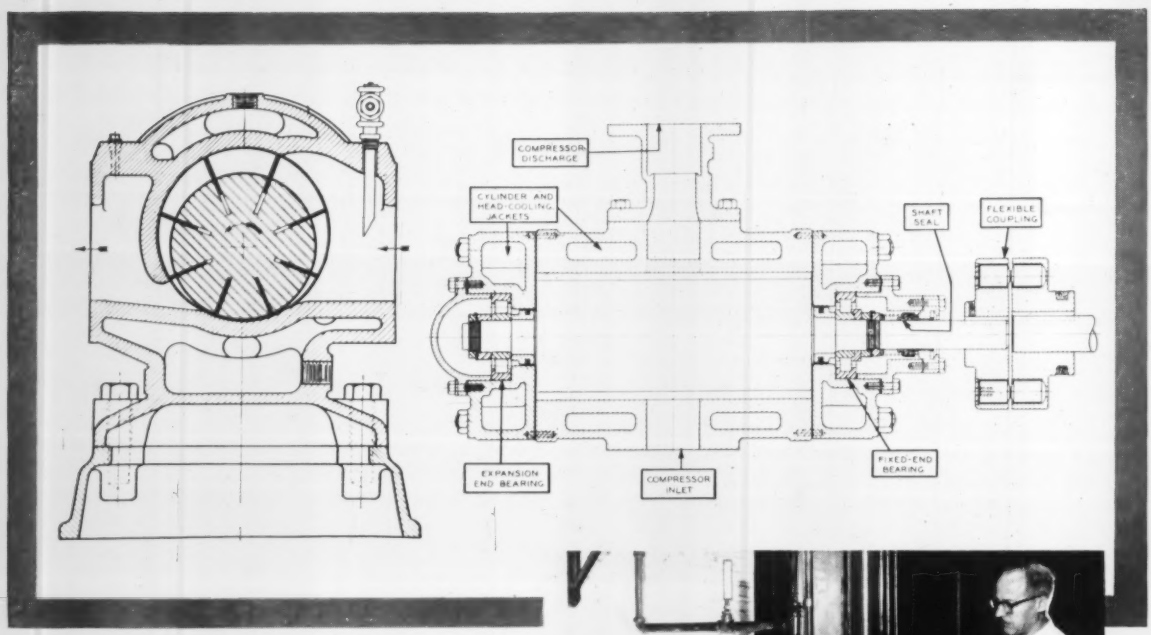
This modern method of packaging does away completely with deposits and the bookkeeping involved; it contributes, too, to lower freight costs. Thus, you avail yourself of a precision-made and quality controlled product, without any handling, shipping and inventory inconveniences.

Roebling Hose Reinforcing Wire, used for braiding reinforcement, is produced in a complete range of sizes. Write Wire and Cold Rolled Steel Products Division, John A. Roebling's Sons Corporation, Trenton 2, New Jersey.

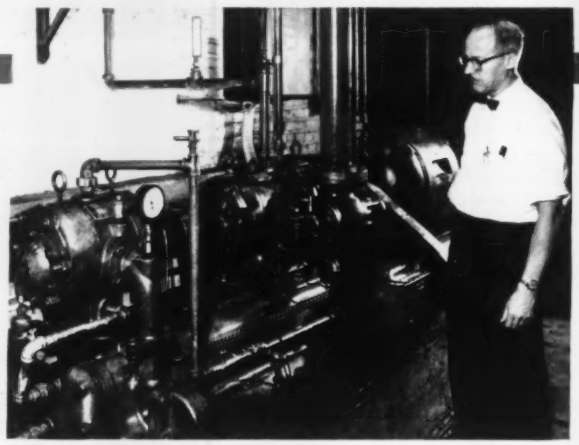
Roebling... Your Product is Better for it

ROEBLING

Branch Offices in Principal Cities
Subsidiary of The Colorado Fuel and Iron Corporation



Hard service never affected this Fuller rotary's original output—230 cfm. of air at 90 lb. G., reports Mr. Schott, chief engineer, Thomas C. Wilson, Inc., Long Island City, N.Y.



FULLER ROTARY COMPRESSOR RUNS 13 YEARS WITHOUT DOWNTIME

A Fuller rotary at Thomas C. Wilson, Inc. got its first maintenance shutdown recently, for renewal of roller bearings and rotor vanes—after running without downtime since 1945.

4 years of 24-hour service. The Wilson plant makes tube cleaning equipment, tube expanders and portable pneumatic tools, and so makes heavy daily demands on shop air. For the first four years, three-shift operation kept the Fuller rotary running round the clock. Since 1949, it's been working eight-hour shifts.

Simple design means trouble-free service. Besides bearings, the only moving parts in a Fuller vane-type rotary compressor are the cylinderical rotor and the blades. These compensate for wear automatically. Cylinder head slips off, permitting blade and bearing inspection in a matter of minutes.

Compact and vibration-free. Direct-drive system saves space. Simple, rugged design gives constant service without extensive supervision. Thus, Fuller rotaries can be installed out-of-the-way—on upper floor, on balconies, in basement corners, using low-cost, light-weight foundations.

1189
C-340

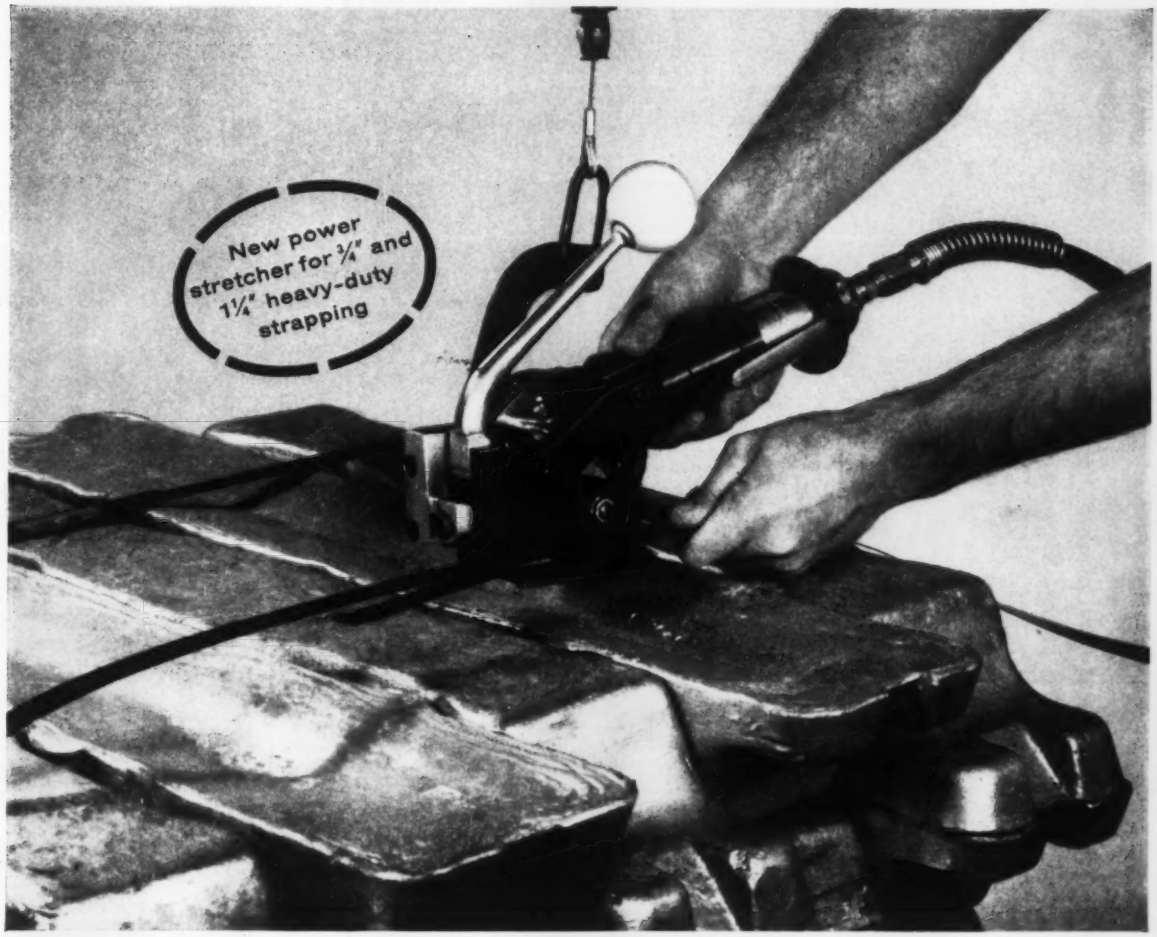
Write today for detailed information on the full line of Fuller rotary compressors for in-plant services, gas gathering, and industrial refrigeration.

FULLER COMPANY
GENERAL AMERICAN
TRADE MARK

FULLER COMPANY
160 Bridge St., Catasauqua, Pa.
SUBSIDIARY OF GENERAL AMERICAN TRANSPORTATION CORPORATION
Birmingham • Chicago • Kansas City • Los Angeles • New York • San Francisco • Seattle

Fuller
....pioneers in harnessing AIR

PIONEERS OF HIGH-EFFICIENCY VANE TYPE ROTARY COMPRESSORS SINCE 1930



Another Acme Steel portable power strapping tool . . .

The new B1R pneumatic stretcher

ACME STEEL COMPANY adds still another model to its line of power-actuated, portable strapping tools. This time it's the rugged B1R Pneumatic Stretcher, an all-purpose tool for heavy-duty strapping—but with the accent on light weight and handling ease.

The B1R eliminates waste as it uses strap directly from the coil, features unlimited high-speed take-up and provides greater residual strap tension. Operation is simple: strapping threads easily into the tool, then a touch of the throttle power tensions strapping to predetermined tension. Motor holds tension until sealed joint is made. A forward stroke of the shear lever cuts strap close to the seal. This tool is readily adaptable to many different strapping applications. Mounting brackets and various types of supports are available.

Your Acme Idea Man can demonstrate the money-saving advantages of the B1R Stretcher as it applies to your packaging operations.

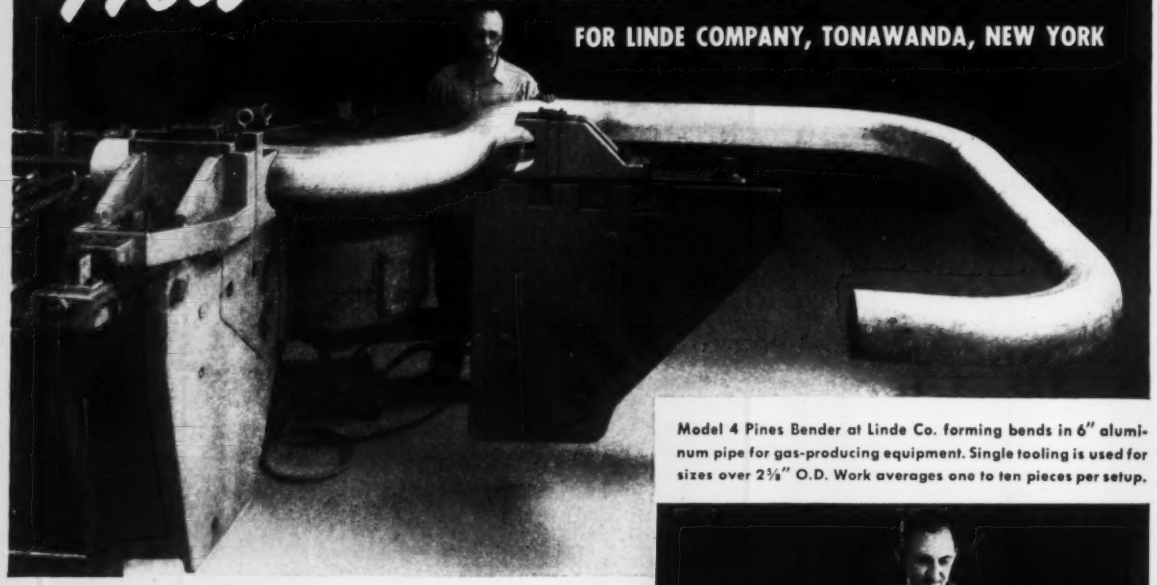
Ask your Acme Idea Man—or write—for free brochure on the new B1R and other Acme Steel powered strapping tools.

Contact your Acme Idea Man at the nearest Acme Steel Company office. Or write: Dept. SDU-89, Acme Steel Products Division, Acme Steel Company, Chicago 27, Illinois. In Canada, Acme Steel Company of Canada, Ltd., 743 Warden Ave., Toronto 13, Ontario.

ACME STEEL **STEEL STRAPPING**

How SHORT-RUN BENDING PAYS OFF 3 WAYS

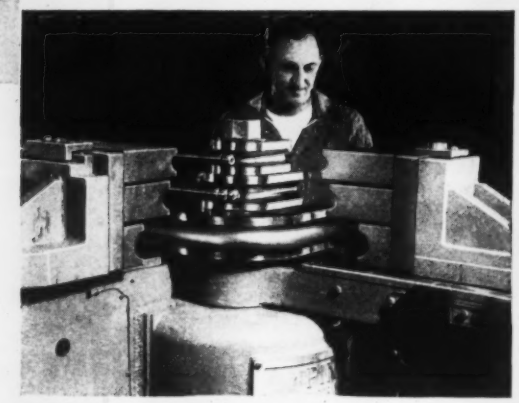
FOR LINDE COMPANY, TONAWANDA, NEW YORK



Model 4 Pines Bender at Linde Co. forming bends in 6" aluminum pipe for gas-producing equipment. Single tooling is used for sizes over 2⅝" O.D. Work averages one to ten pieces per setup.

Diverse Jobs Now Handled on Two PINES Machines

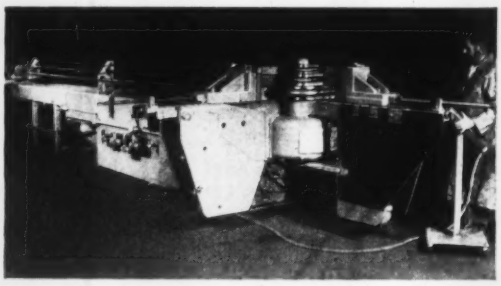
Here's another example of how extremely short runs can be handled efficiently and profitably on Pines Bending Machines. At Linde Company, Division of Union Carbide Corporation, Tonawanda, New York, a large Pines Model 4 and a medium-sized Model 2 Machine are now employed to make bends in a variety of copper alloy, stainless steel, and aluminum tubing. Tube sizes range from ½" up to 6" O.D. Lots average from one to ten pieces per setup. Results show a three-way saving. A large number of costly fittings previously used in fabricating oxygen and inert gas equipment has been eliminated. This, in turn, has effected a substantial reduction in the number of welding operations required. In addition, the facility for making bends quickly and as required has made possible a substantial reduction in inventory investment.



View of stacked die tooling which permits individual bending of three different tube sizes (1⅝", 2⅛", 2⅝" O.D.) without tool changes. Simple machine settings handle different angle requirements.

Multiple Dies Minimize Setup Time

As illustrated, for work up to 2⅝" O.D., a number of multiple stacked dies are employed which substantially reduce setup time. Tools are designed for interchangeability between the Model 2 and Model 4 machines. This permits handling as many as seven different tube sizes without a tool change. The ability to handle different bend angles that a given job may require by simple settings on the machines, contributes also to the efficiency the Linde Company has achieved in handling their requirements.



Over-all view of Model 4 machine equipped with three mandrels and stacked dies. Selection of standard radii also minimizes tooling and setup requirements over a wide range of sizes.

PINES ENGINEERING CO., INC.

Specialists in Tube Fabricating Machinery · 662 WALNUT • AURORA, ILLINOIS

PRODUCTION BENDING • DEBURRING • CHAMFERING MACHINERY

FREE CASE STUDY DATA

Ask your Pines representative for assistance in analyzing your present bending methods. There is no obligation. Or, write today for additional facts and case study data on the cost-cutting advantages of production bending.

You're invited to see how grease affects your profit picture

Texaco has produced a film called "Shear Magic". It explains why and how grease has kept pace with technical advances in your plant.

Like everything else, grease is no longer simple.

How could it be. In industry, heat is hotter and cold is colder. Speeds are faster, pressure heavier. All the more reason why you'll find this film interesting.

"Shear Magic" is not a sales film.

It is devoted entirely to helpful information about greases. You will see how only the right greases protect against heat, water, cold, dust, shock and other problems in a modern plant. You will learn how the right grease schedule – one planned exactly for your operation – can help you control costs.

If you'd like to switch off the lights and view this film, mail the coupon today.

TEXACO

Texaco Inc.
Room 2006, Dept. S-G-11
135 East 42nd Street,
New York 17, N. Y.

Please send me more information about a free showing of "Shear Magic" to my organization.

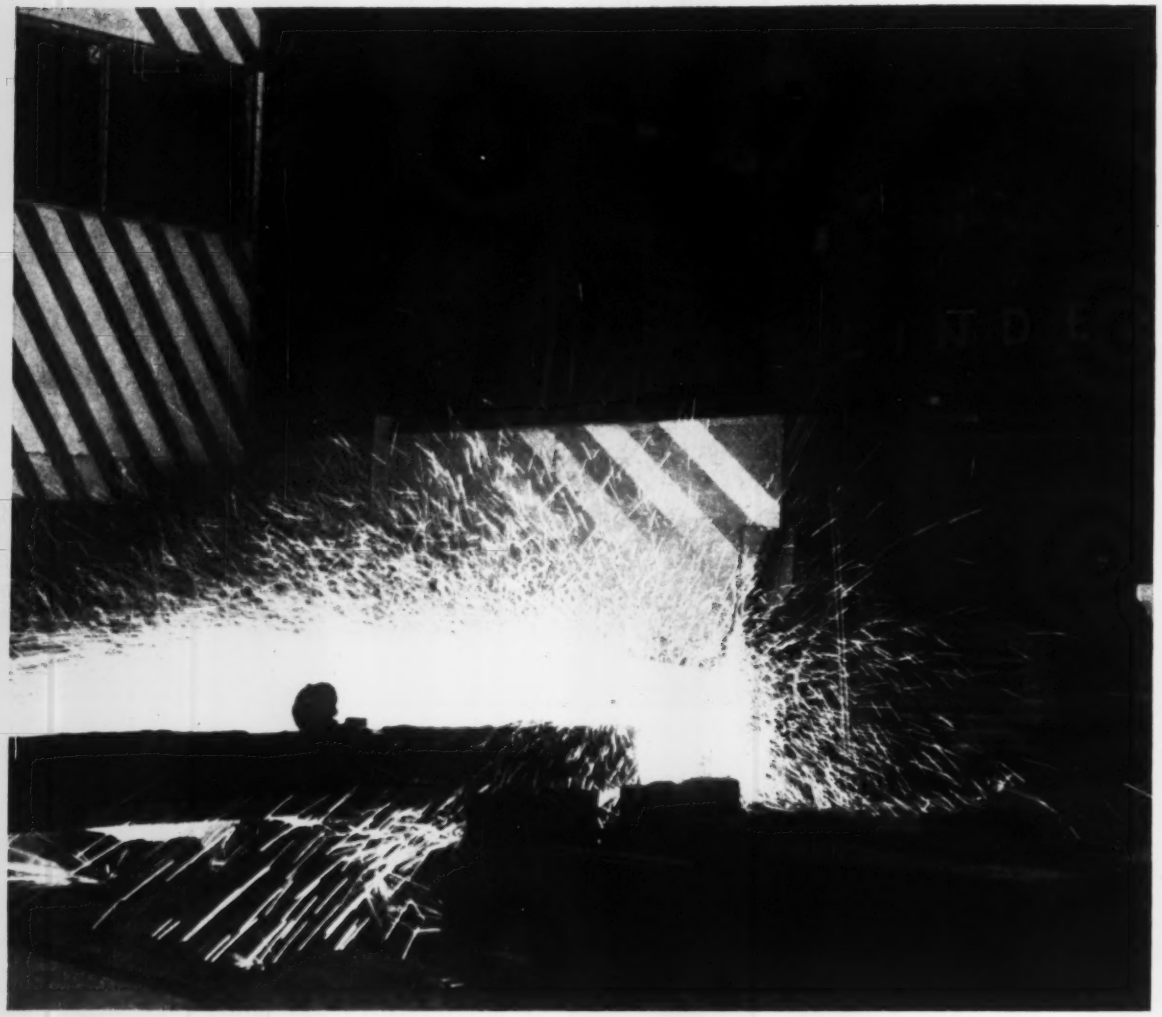
Name _____

Company _____

Address _____

City _____ State _____

LUBRICATION IS A MAJOR FACTOR IN COST CONTROL



LIN-DE-SURFACER MACHINE HOT-SCARFS 4.27 MILLION TONS IN 27 MONTHS

Weirton Steel Company, Division of National Steel Corporation, set the record. Of the 65 *Lin-de-Surfacer* machines serving steel plants throughout the world today, this is the champ—4.27 million tons in just 27 months.

Mechanized scarfing is the fastest, most economical way to upgrade surface quality. Your costs depend on your production because you lease the *Lin-de-Surfacer* machine on the basis of the tonnage it processes. It can be rolled on or off the production line in seconds. Scarfing speeds can reach 195 ft. min.

And—most important—savings over hand-conditioning methods are estimated conservatively at $1.50 per ton—are often much higher.

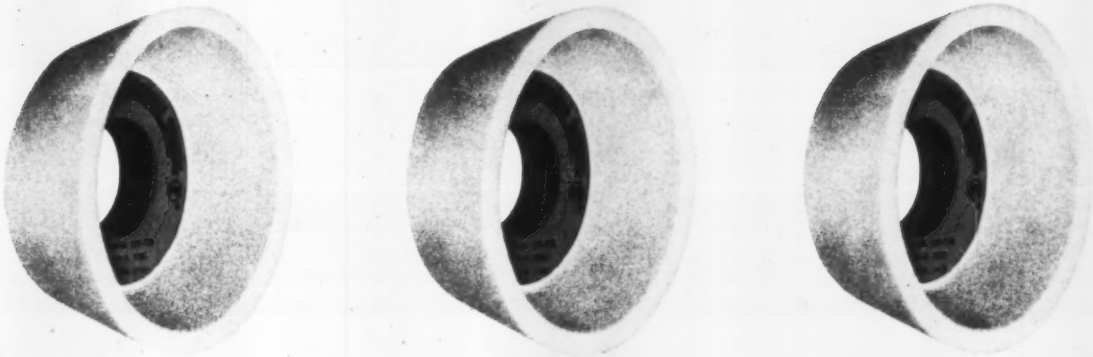
Linde Company—a leader in the production and distribution of oxygen and acetylene—pioneered the development of mechanized scarfing. To find out how hot-scarfing can help your operations, call the nearest Linde office. Or write Linde Company, Division of Union Carbide Corporation, 30 East 42nd Street, New York 17, N.Y. In Canada: Linde Company, Division of Union Carbide Canada Limited.

Linde TRADE MARK

UNION CARBIDE

"Linde," "Lin-de-Surfacer," and "Union Carbide" are registered trade-marks of Union Carbide Corporation.

POSITIVE DUPLICATION – EVERY TIME!



Each of these gyroscopes positively duplicates the built-in balancing action of every other gyroscope.

And *balance built-in* is an important advantage you get with the toolroom cup wheels shown above, and with *all* CINCINNATI (PD)° GRINDING WHEELS. They are manufactured by a remarkable process that gives Positive Duplication, time after time after time.

With every step of manufacturing rigidly controlled, this unique (PD) process produces wheels of unsurpassed uniformity. One important result: balanced action for a safer job . . . a better job.

When you reorder a CINCINNATI (PD) WHEEL, it will act and grind exactly like the original, helping you maintain production, saving time and money. Whatever shape, grade and size

you specify . . . centertype, centerless, internal, surface, toolroom or snagging wheel . . . you get Positive Duplication — every time!

Our factory representatives are trained specialists, experienced in grinding job set-ups and operations. For their help on those extra-tough grinding problems, call your CINCINNATI (PD) GRINDING WHEEL distributor, or contact Cincinnati Milling Products Division, Cincinnati 9, Ohio.

(PD) POSITIVE DUPLICATION

CINCINNATI

GRINDING WHEELS

A PRODUCTION PROVED PRODUCT OF THE CINCINNATI MILLING MACHINE CO.

A mirror-like finish is achieved on this toaster housing with Udylite "66"

THE INCOMPARABLE "66"

Udylite's Bright Nickel Process "66" is sweeping the country with new installations and conversions to provide a truly incomparable plate with almost unbelievable ease of operation. The color of the process alone, sells "66" in any comparison.

The production of your existing equipment can be *greatly increased* with the introduction of Process "66". Its outstanding qualities include exceptional levelling ability and remarkable ductility for so bright a finish.

In addition, Process "66" has overcome the problems previously considered inherent in plating over semi-bright nickel and, it is unusually receptive to chromium. You'll find that the amazing adaptability of this very bright finish makes it suitable for your finest work . . . moreover it will save you money.

A phone call or letter will start Udylite's "66" Bright Nickel process on its way to help you improve your production. If it sounds too good to be true, just send us a sample of your product . . . we will be happy to test-plate it for you with Incomparable "66". Act TODAY!

SUPER "66" For even greater brightness and levelling where absolute maximum ductility is not demanded, Udylite's SUPER "66" may be specified. You must see this finish to believe its brilliance.

the **udylite** corporation

detroit 11, michigan • world's largest plating supplier

thermal thicket

Problem: *The heat barrier which now hinders hypersonic aircraft and missiles.*

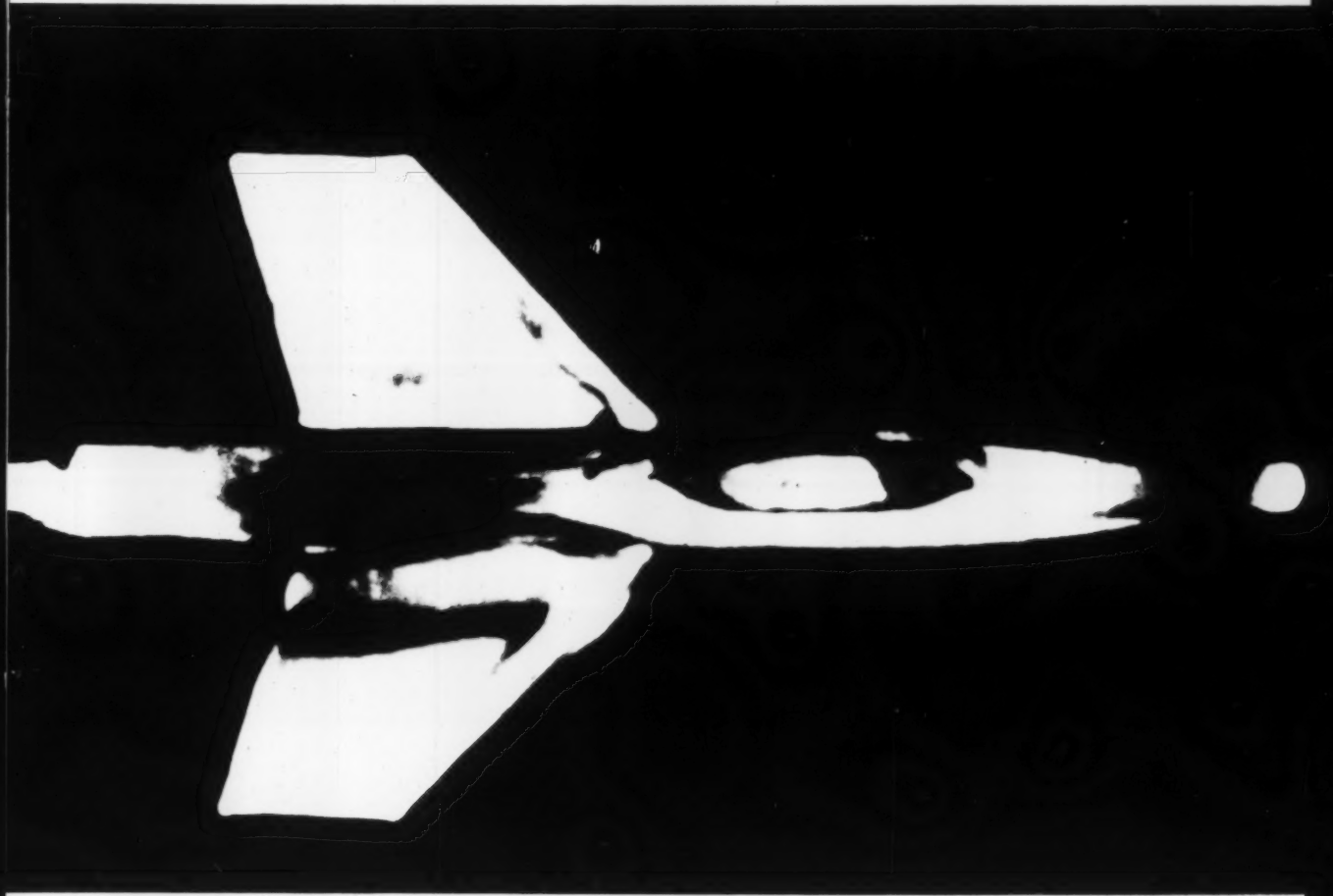
Needed: *Dependable high temperature alloys for structural components.*

Solution: *Find the right alloys that are easy to forge and machine and are truly uniform.*

Source: *Predictable performance Carpenter alloys made by the exclusive Mel-Trol, VacuMeltrol and Consumet melting processes.*

Engine builders find them ideal for many critical parts. Forge shops report improved forgeability resulting in better finishes requiring far less machining. Work goes faster. Rejects are fewer.

Call your local Carpenter Representative for the whole story about predictable performance alloys and how they can benefit you. The Carpenter Steel Company, Reading, Pa.



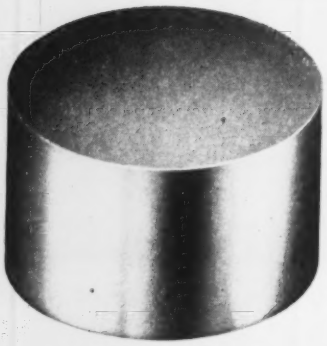
a new company 70 years old

Carpenter steel

The Carpenter Steel Company, Main Office and Mills, Reading, Pa.
Alloy Tube Division, Union, N. J.
Webb Wire Division, New Brunswick, N. J.
Carpenter Steel of New England, Inc., Bridgeport, Conn.

WHY BUY METAL YOU DON'T USE?

Switch to Allegheny Ludlum Cast-to-Shape Tools



FORGED DISC

Forged disc necessary for fabricating welded tube mill roll.

CAST-TO-SHAPE TOOL STEEL

Cast-to-shape welded tube mill roll. 220 lbs. lighter than forging; $780 cheaper for finished shape.

$780 Saved by changing to Cast-to-Shape

Why pay for metal that ends up chips on your floor? Here are two pertinent reasons why you should stop hogging your complex tools from blocks of metal and let Allegheny Ludlum cast them to shape.

CAST-TO-SHAPE MEANS YOU BUY FEWER POUNDS OF METAL.
For example, the roll shown above is 220 pounds *lighter* in the rough state than its forging cousin. Allegheny Ludlum cast-to-shape tools are more economical than tool steel forgings, *and* just as strong in certain applications.

CAST-TO-SHAPE MEANS LESS FINISH MACHINING.
This is especially important with a complex shape. For instance, the casting above has only ¼ to ⅜ inches of machine stock on its surfaces, requiring only one roughing and one finishing operation. Estimated savings by using an Allegheny Ludlum cast-to-shape tool amount to $780.

WSW 7271

Allegheny Ludlum, a tool steel producer who makes cast-to-shape tools, casts them with the same precise quality control for which their tool steels is known. A full line of cast-to-shape tool steel grades is available. You'll find ones with high resistance to abrasion, compressive strengths of approximately 400,000 psi, easy machinability, hardening with almost no distortion, toughness, high red hardness, and the capacity to take a high polish.

Find out now how you can cut costs on your complex tools. Write for FC-4, a 28-page technical discussion of A-L's Forging and Casting Division with applications, pattern information, design tips, analyses, and heat treating instructions. Or call your nearest A-L tool steel warehouse or distributor.

ALLEGHENY LUDLUM STEEL CORPORATION, OLIVER BUILDING, PITTSBURGH 22, PENNA.
Write to Dept. S-201

ALLEGHENY LUDLUM

Tool Steel warehouse stocks throughout the country . . . Check the yellow pages

EVERY GRADE OF TOOL STEEL . . . EVERY HELP IN USING IT

Hot Saw and Mill, Sawhill Tubular Products, Inc., Mercer Pipe Division, Sharon, Pennsylvania.

Continuous Butt Weld Pipe Mills

• The producers of pipe, together with Aetna-Standard, continually search and develop ways to improve costs and yields and to develop a better pipe product.

Each Continuous Butt Weld Pipe Mill has individual characteristics . . . new ideas and innovations specifically for the individual production needs. No mill is an exact duplicate of a previous mill.

Two of Aetna's best known developments for increased production have been the Rotary Hot Saw and the Rotary Kick-Off. Many other developments have been tested and applied, particularly in the area of pipe handling.

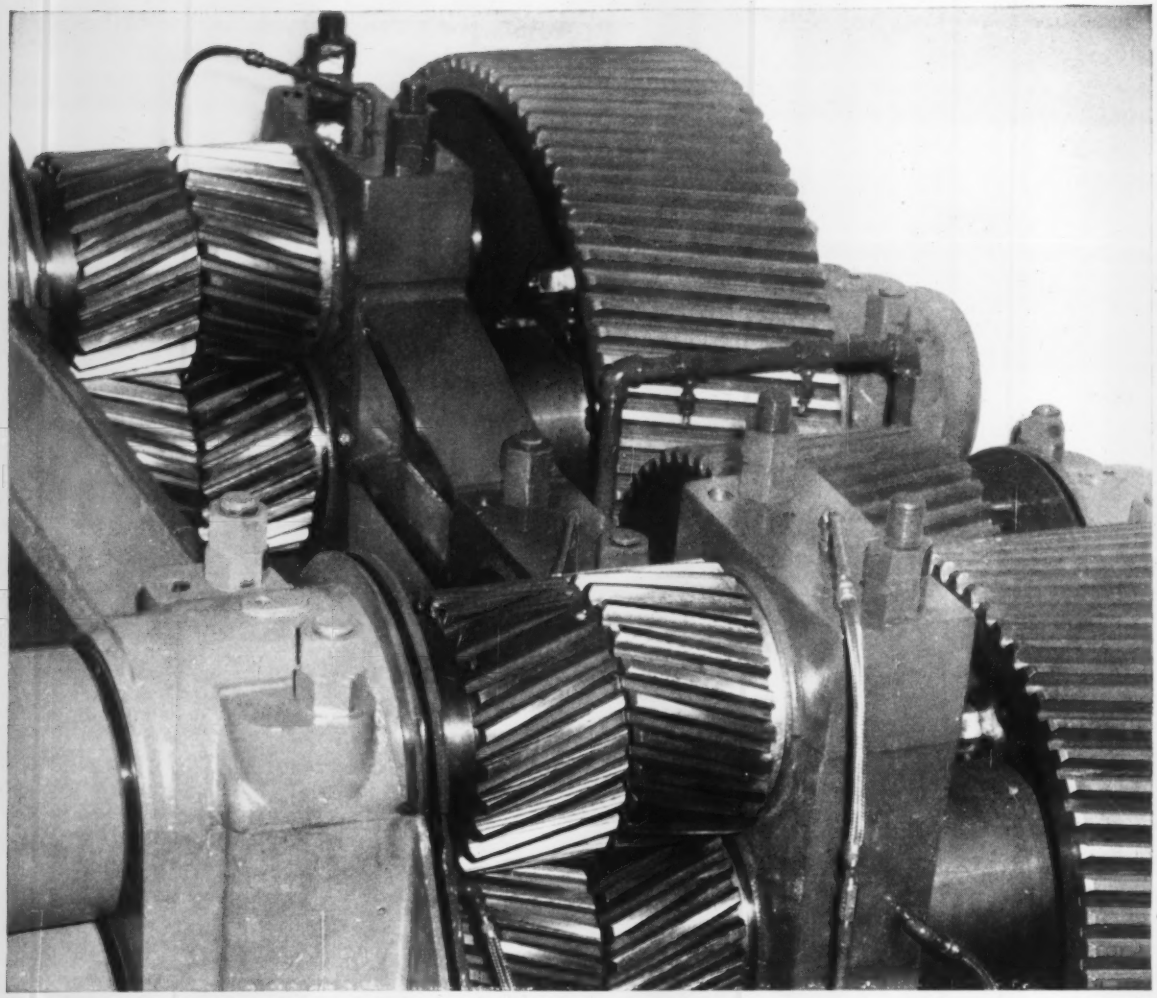
Aetna-Standard builds more of these mills than any other manufacturer, not only in this country but in foreign lands as well. Aetna mills produce in different size ranges from ⅛" to 4" at ever-increasing mill delivery speeds.

BLAW-KNOX

BLAW-KNOX COMPANY

Aetna-Standard Division

Frick Bldg., Pittsburgh, Pa.



Rolling mill pinions of Type 4620 nickel-molybdenum steel have a good hard case (500-550 Brinell) plus toughness, stand up to severe overloads. Made by Morgan Construction Company, Worcester, Mass.

4620 Nickel alloy steel gives them 4 times longer service

Hardened rolling mill pinions in an Eastern steel plant were not giving satisfactory service, due to continuous overloading. They just weren't tough enough to take the beating of heavy rolling.

Designers solved the problem – called for pinions of 4620 nickel-moly carburized steel ground after hardening. Now they've got a good case – pinions don't crack . . . tough cores support them.

This case stood up – the 4620 nickel alloy steel pinions have served over *4 times longer* than the old through-hardened pinions . . . and are still going strong.

This high-performance pinion was *not* difficult to make. It was rough-machined at a hardness of 187/220 Brinell; showed little distortion through carburizing and hardening. Only 0.005" was needed for finish grinding, after hardening to 500/550 Brinell.

Parts that take a beating in heavy equipment must also have practical service life – you get both in nickel alloy materials.

For practical information on 4620 nickel alloy steel and its application to your specific metal problems, write Inco's Development and Research Division.

THE INTERNATIONAL NICKEL COMPANY, INC.

67 Wall Street INCO New York 5, N. Y.

INCO NICKEL

NICKEL ALLOYS PERFORM BETTER LONGER

For Steelworkers, It's Pay for No Work Anyway

One big reason for the current lengthy steel walkout is the industry's demand that featherbedding practices be discontinued. It's an effort to cut back on the amount of time for which steelworkers get pay without working. But the striking steelworkers are getting another form of pay for not working: Relief. About 2000 have applied for it in the Cleveland-Youngstown-Lorain area. "One man had the gall to come in for relief the day after he made a down payment on a new car with his SUB check," reports Mrs. Elfrieda Thomas, Lorain city welfare director. SUB payments are one reason why pressure hasn't mounted yet among workers for a settlement. Inventories are large enough to keep pressure from users low too (Page 43).

Steelmaker Sees Strike Aiding Imports

"With the nationwide steel strike, foreign producers are threatening to move in on us in a big way," asserts William M. Hall, Wheeling Steel Corp. vice president. "They've combined the lessons of technology learned from us with . . . low employment costs . . . an extremely tough combination to beat," he says. He estimates German and British wage scales to be 75 per cent below those of the U. S., and Japanese costs to be 85 per cent lower than ours. During July, the Port of Chicago received 37,459 tons of foreign steel vs. 35,635 tons in June. Belgium, Norway, and Germany accounted for nearly all of the incoming tonnage.

He Has Way to Settle Strike

STEEL's mailboys have been wielding heavier sacks lately as mail pours in from people with suggestions on how to settle the steel strike. The majority think the industry should maintain its position. A small minority want the government to move farther into the bargaining. A few think the union "should get something." One letter not in those categories comes from J. J. Jehring, director, Profit Sharing Research Foundation, Evanston, Ill. His solution: It's based on profit sharing (Page 46).

Highways to Use More Galvanized

Expect shipments of galvanized steel sheets for use in culverts, guard rails, and other highway construction items to climb near the 400,000 ton mark this year. Last year, this market took 332,619 tons, reports the American

Iron & Steel Institute. That was a 22 per cent gain over 1957 consumption. First quarter, 1959, shipments were up 65 per cent from a year ago (Page 132).

Subtle Shift in Steel Markets

During 1959's first half, the auto industry regained its position as No. 1 steel buyer (a title lost last year), thanks to booming sales of '59 models, like the Rambler in the picture. Steel shipments to all buying categories were up during 1959's first half compared with the 1958 period, with two exceptions: Exports fell 222,383 tons and military supply shipments dropped 30,567 tons. For details on who bought what, see Page 131.

Ductile Iron Pipe Gains Ground

Look for production of ductile iron pipe to triple this year and hit 100,000 tons annually by 1961. That's the prediction of International Nickel Co., developer of the material. About 500 firms are now licensed to produce it. Fastest growing applications: Water mains, underground gas distribution systems, pipes aboard tankers, lines in chemical plants.

Oilmen Aren't Hurt by Strike

The oil industry won't be pinched by lack of steel for several weeks—probably not until mid-September, if the strike lasts that long. So foreign pipe hasn't gained much ground due to the walkout—yet. Second hand dealers aren't too busy either, but they'll be swamped if the strike goes another month.

Boosting Your Capital Spending?

If you are, you're typical of the nation's metalworking companies. Examples: They'll buy 32 per cent more joining and assembly equipment in 1959's second half than during the first six month. Industries showing the largest spending increases: Automotive, electrical machinery and equipment, metalworking machinery. Price fighting still prevails among the equipment makers, but you can look for firming, and even a few hikes, by yearend. On Page 50, you'll find the sixth article in STEEL's new series on capital equipment prospects.

Checked the Prefab Home Building Market Lately?

It may be well worth your while to examine the prefabricated home manufacturing industry. It will probably sell nearly 137,000 units this year—up 25 per cent from last year. The biggest of the industry, National Homes Corp., last week announced the acquisition of seven other builders, boosting

National's 1959 sales to 43,000 units and giving it manufacturing facilities in 12 states. The move may strengthen aluminum's position in the industry as National is selling aluminum models rapidly and plans to introduce new ones. Current ones use 3000 to 5000 lb of the light metal per house.

Why Increase R&D?

"It's the tool you use to compete in tomorrow's markets," stresses Paul Goudy (picture), chief engineer of Square D Co.'s Industrial Controller Div. He believes that too often management places emphasis on just catching up with competition. R&D efforts should be aimed at leading your competition. To see what Mr. Goudy and other managers are doing to get their R&D dollar's worth, turn to Page 87.

Come Fly with Me? No, Say Industry Brass

The National Industrial Conference Board reports that 60 per cent of the companies it surveyed place limitations on the number and rank of executives who may fly in the same plane at one time. Usually, no more than two or three may go together. The restrictions apply to the company's top echelon, members of management operating committees, key department heads, and sometimes, the executive committee and board of directors.

Standardization Trims Costs

The coils in the picture represent the way one company cut material costs through standardization. It began slitting its own, rather than paying quantity and size extras for the wide variation needed. That practice—or the converse—may be an answer to your purchasing problems. STEEL's latest Cost Crisis report (Page 98) shows you how several firms reduced material costs through standardization. It may suggest a money-saving method you can use.

Water Carrier Fleet Is Growing

Expect the nation's inland waterway fleet to handle 425 million net tons of cargo and provide 138 billion ton-miles of service next year. By 1965, it'll handle 488 million net tons with 178 billion ton-miles. "The industry could expand its services 20 to 25 per cent now to carry 500 million net tons," B. B. Carr, president, American Waterway Operators, told Congress.

Retirement Funds Lean Heavier on Common Stocks

At the beginning of the year, common stocks accounted for 36 per cent of the total assets in the nation's employee retirement funds. That's a 5 per

cent boost in 12 months, reports Commerce Clearing House, Chicago. Corporate bonds still account for the largest part of the funds—38 per cent. Government bonds make up 11 per cent; mortgages and real estate, 5 per cent; preferred stocks, 4 per cent.

The Case of the Vanishing $100,000

The manager of a small company thought he was going to show a profit of $100,000. Then he took physical inventory. After writeoff, he saw red ink. Where he failed: Poor inventory control. "We believe it costs us about 20 per cent a year to carry inventory . . . hence, a $5 million reduction can put something near $1 million of before-tax profits into the till," reports Howard A. Gay, vice president, Cincinnati Milling Machine Co. There are several approaches that can save you time and money on inventories. But the method you follow should be flexible (Page 58).

Malleable Founders Are Optimistic

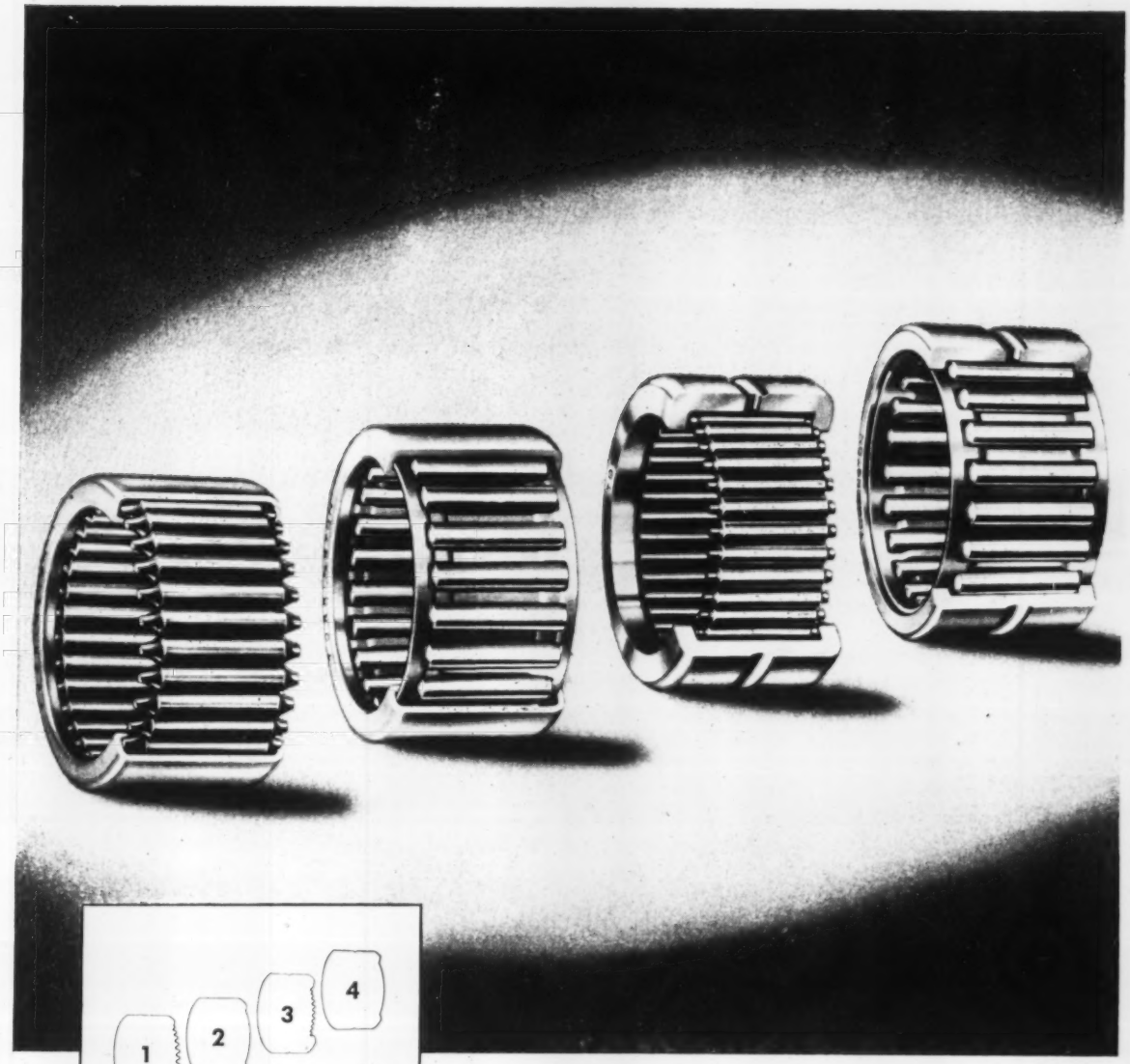
Major suppliers of malleable iron castings to the auto industry have hiked their production capacity 18 per cent in preparation for the 1960 model year, reports Lowell D. Ryan, executive vice president, Malleable Founders' Society. The firms are confident that the current sales upsurge will continue into 1961, he says. The industry is producing at a rate about 50 per cent higher than last year's. Shipments this year will approximate 922,000 tons, about half automotive. The total could exceed 1 million tons next year, predicts Mr. Ryan.

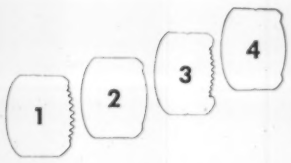
Pay Check Deductions Become Bigger Burden

Besides withholding federal income and social security taxes, employers now must: 1. Collect state income taxes in 19 states (including Hawaii) and the District of Columbia. Oklahoma will join the group later this year and North Carolina will next year. 2. Deduct unemployment insurance taxes in three states. 3. Gather disability benefit taxes in four states. This year, 12 states considered withholding tax laws and proponents were successful in seven, reports Commerce Clearing House, Chicago.

Straws in the Wind

The Air Force has canceled General Electric Co.'s contract for development of a high energy fuel engine to be used on the B-70 supersonic bomber, but will continue the B-70 program with another engine . . . Chrysler Corp. will reactivate a former assembly plant on Wyoming Avenue in Detroit to ship auto parts to overseas assembly plants. About 300 people will be employed by mid-October . . . Last Friday, Ford Motor Co. started closedowns for 1960 model changeovers.





Torrington Drawn Cup Needle Bearing ... for maximum radial capacity in minimum cross section ... positioned by press fit—snap rings or shoulders unnecessary ... runs directly on hardened shaft ... most compact, light weight, economical.

Torrington Drawn Cup Roller Bearing ... for higher speeds or long pregreased life ... thin section race for simple press fit ... runs directly on hardened shafts ... unit construction for easy assembly ... shaft-riding retainer.

Torrington Heavy Duty Needle Bearing ... for use with thin section or split housing where extreme impact loads require heavy outer race ... maximum shock resistance ... full roller complement ... unit construction.

Torrington Heavy Duty Roller Bearing ... for combination of high speed, long pregreased life or shock resistance ... roller stability provided by end-guiding ... flange-riding retainer ... unit design.

All of these types of bearings are available with inner races.

Only Torrington Makes All Four!

Torrington developed the Needle Bearing and its specialized variations. This breadth of experience assures impartial engineering recommendations based on specific application requirements. You can rely on Torrington to recommend the most compact and economical design compatible with operating conditions and performance requirements. Call on your Torrington representative for help in applying the right bearing in the right place. **The Torrington Company, Torrington, Conn.—and South Bend 21, Indiana.**

TORRINGTON BEARINGS

Every Basic Type of Anti-friction Bearing

NEEDLE • SPHERICAL ROLLER • TAPERED ROLLER • CYLINDRICAL ROLLER • NEEDLE ROLLERS • BALL • THRUST

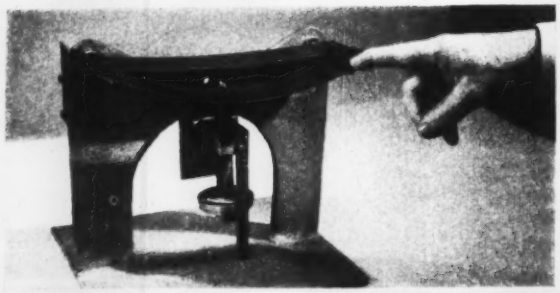
ARMCO ENAMELING IRON
resists sag, reduces defects, helps you sell

New steels are born at Armco

It's made only for porcelain enameling

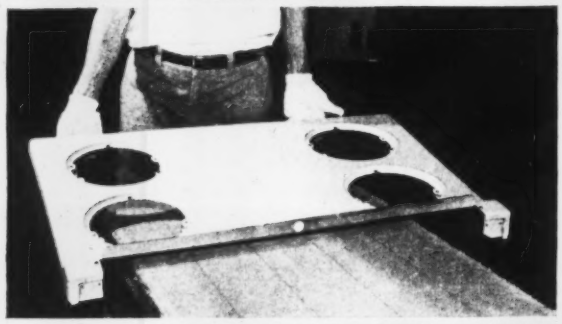
Resists sag

Fired at the same temperature, mild steel (front) droops badly, while Armco Enameling Iron (rear) stubbornly resists sag. With this special enameling base, critical dimensions of porcelain enameled parts stay accurate.



Fewer finish defects

Commercially-pure Armco Enameling Iron contains a minimum of gas-forming impurities. Because of its high purity, costly shop rejects for finish defects stay low.



Helps you sell

At point of purchase, where competing products often stand side by side, close fit of parts and defect-free finish help clinch sales.

For shop savings and showroom sales, specify top-quality Armco Enameling Iron. It's made *only* for porcelain enameling. Just send the coupon for complete information.

ARMCO STEEL CORPORATION
3009 Curtis Street, Middletown, Ohio

Please send me a copy of the catalog, "Armco Enameling Iron."

Name_____ Title _____

Firm_____

Street_____

City_____ Zone____ State_____

ARMCO STEEL

ARMCO®

Armco Division • Sheffield Division • The National Supply Company • Armco Drainage & Metal Products, Inc. • The Armco International Corporation • Union Wire Rope Corporation • Southwest Steel Products

The Extra Ten

Americans returning from visits to European industrial plants are impressed by the attitude of workers in those countries.

Most do not have automobiles, popup toasters, and the things the American worker takes for granted. But they want them. And they are willing to work just a little harder and a little more cheerfully to get them.

The willingness to work is even more noticeable in Japan, reports Glenn Moore, export sales manager for Heald Machine Co., Worcester, Mass. Laborers there toil painstakingly and cheerfully for long hours at rates of pay about one-seventh of American rates. Their attitude has contributed mightily to Japan's remarkable postwar recovery and to the fact that Japanese goods are found almost everywhere in this country.

No one suggests that Americans should swap working conditions or living standards with either the Western Europeans or the Japanese. But Mr. Moore returns deeply impressed with the fact that our heritage of comfort and convenience must be eternally earned, particularly in the face of the competition the revitalized industries in foreign countries offer. He suggests that every worker—management, clerical, production—could easily produce 10 per cent more without hardship.

We suspect Mr. Moore is right. We believe a 10 per cent improvement in productive efficiency would restore us to a competitive position in the important world and domestic markets. We believe that is the avenue to holding our high income rates and our high standard of living.

Sadly, we can't see much progress being made in that direction. We are in the midst of a nationwide steel strike that soon will begin to cripple the economy. The strike easily could be settled if the union would agree to rewriting contract provisions that restrict productive efficiencies. The elimination of Section 2-B alone would save 6 to 10 cents an hour in steelmaking costs. Should the union agree to those changes to improve efficiencies, the companies would gladly grant modest wage increases. The strike could be settled on a noninflationary basis, and we could move forward toward even higher standards of living.

Properly, all Americans are proud of the standard of living we have achieved. But the maintenance of those standards is not automatic. They cannot be supported by union negotiation, nor by government edict. They can only be nourished by higher productivity. And that's a job for all workers—on the production lines, in the laboratories, in the professions, and in management.

We need that extra 10 per cent.

Walter J. Campbell

EDITOR

SINCE
1887

JUST WHAT YOU WANT

... standard and special washers for every purpose ... sizes, shapes, and materials to meet your requirements

Whether your immediate need is for tiny brass washers averaging 588,000 to the pound — or massive washers 23¼" in diameter, weighing 21 lbs. each — Wrought Washer *has* or *can produce* just what you want, to your specifications. Over 100,000 sets of dies are available to you without extra cost. If your specifications happen to match any one of them, the cost of new dies is eliminated.

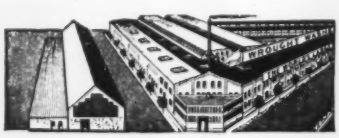
As the world's largest producer of washers, we offer you a dependable source of supply for the washers and stampings you need — anything that can be punched out of metal, plastics, fibre, and other materials — within the practical limitation of mass production. You, as a user of washers, are assured of *highest quality* at competitive prices. Send us your specifications so that we may quote on your washer or stamping requirements. Write for Catalog 40-A if you do not have a copy.

All Standard and S.A.E. sizes are available in 1-lb. and 5-lb. boxes as shown here, and in 100- and 200-lb. containers for bulk orders.

WROUGHT WASHER MFG. CO.

the world's largest producer of washers

2103 S. BAY STREET · MILWAUKEE, WISCONSIN



A9-9707

Hopes Faint for Early Steel Settlement

CHANCES for an early settlement of the steel strike look as bleak as at any time since negotiations started May 5.

Steelworker President David J. McDonald wasn't even at bargaining sessions last week, refusing to meet with industry's representatives because they are, he said, "nothing but messengers." He claims it's not right that he, a president, should have to deal with vice presidents on the management side.

• **Why the Absence?**—However, his real reasons for absence are probably more prosaic: 1. He's bored with the kind of work the negotiators are doing—the tedious job of hammering out contract language in some of the less controversial areas. 2. He needs to get out to the picket lines to bolster morale.

While no members have defected and while the rally-round-the-union spirit is still high, Mr. McDonald is enough of a realist to know that such harmony can't last much longer without stimulation. The strike currently (Aug. 17) is 34 days old—the duration of the 1956 stoppage. With the lack of progress to date, this walkout could easily set a postwar record in length, surpassing the 55-day marathon from June 2 through July 26, 1952. No wonder the union president last week was racing around to many of the steelmaking centers giving pep talks.

State employment agencies report striking steelworkers are "fairly active" in searching for temporary jobs. They're not having much luck finding them, but few steelworkers are yet on relief.

• **Pressure for Settlement?** — So, union members aren't pressing hard for a settlement. Nor are steel users even though a few consumers have had to close down. One of the most important is A. O. Smith Corp. It shut its pipe mill in Milwaukee Aug. 15, and it will remain down until about ten days after the end of the steel walkout.

But most steel supplies are still adequate for near normal operations until early October, an inventory reassessment shows (Page 129). In industries dependent upon steel business, the Pennsylvania Railroad's experience is indicative. It has furloughed more than 7600 because of the strike.

• **What Will U. S. Do?**—Layoffs will mount from now on among steel users and industries like the railroads that are dependent upon steel. Striking steelworkers will feel the financial pinch increasingly. With the two sides virtually dead-

STRIKE LOSSES

(Through Aug. 17)

Lost Steelworker Wages

---------- $343,600,000

Lost Sales

----------$1,008,000,000

Lost Production (ingot tons)

----------9,625,400

Other Losses

Overhead, depreciation, and salaries of nonproduction workers in steel.

----------$192,000,000

Tax Losses to U. S.

$225,000,000

locked, what will the government do? And when?

"We'll have to do something pretty quick," admits one U. S. official close to the situation. The "something" would first be behind-the-scenes diplomacy by somebody high up, perhaps Vice President Nixon. Mr. Eisenhower is cool toward the course urged by some senators, especially Stuart Symington (D., Mo.)—that the President formally call both parties to the White House and give them a settlement deadline. If behind-the-scenes moves fail, Taft-Hartley's 80-day cooling off period would be invoked, probably before mid-September. By then, public pressure will be too great for the administration to ignore. The strike's direct losses already total nearly $1.8 billion and would reach almost $3.3 billion by Sept. 14. Some economists think that's high enough for Presidential intervention which Mr. Eisenhower has said would come if "it became economically necessary."

• **Who Wants T-H?** — Ironically, the United Steelworkers is eager for the benefits of the union-hated law. The government is lukewarm about the idea, and industry opposes its use.

Federal officials admit that a cooling off may turn into a warming up. Steel companies want a showdown now and dislike returning to work with no assurance that they won't have to go through the expensive business of shutting down again only 80 days later. T-H invoked in mid-September would postpone another crisis until the first week in December.

• **Who's Operating?**—Last week, 68 plants of 59 steel companies were in operation (see table at right). Their combined annual ingot capacity is 22,324,990 tons, about 15 per cent of the industry's total.

Contracts at five plants (total capacity: 521,100 tons) expired at the end of the week. At press time, four plants were negotiating for an extension while one was still arbitrating local issues.

The contract with Timken Roller Bearing Co., Canton, Ohio, expires Aug. 24. Contract expirations occur at 12 other plants at the end of the month.

Steel Firms Still Operating

Steel Producer	Location	Annual Ingot Tonnage	Contract Expiration or Situation (Aug. 12)
Alco Products Inc.	Latrobe, Pa.	108,650	Big steel settlement plus 30 days
Alan Wood Steel Co.	Ivy Rock, Pa.	800,000	Big steel settlement plus 30 days
Armco Steel Corp.	Middletown, Ohio	2,557,000	non-USW
Armco Steel Corp.	Butler, Pa.	557,000	non-USW
Atlantic Steel Co.	Atlanta	400,000	Open end contract
Baldwin-Lima-Hamilton Corp.	Burnham, Pa.	188,710	8/31/59
Borg-Warner Corp., Ingersoll Steel Div.	New Castle, Ind.	64,000	non-USW
Braeburn Alloy Steel Corp.	Braeburn, Pa.	20,730	Indefinite extension
A. M. Byers Co.	Ambridge, Pa.	90,000	8/31/59—Day-to-day extension thereafter
Cabot Shops Inc.	Pampa, Tex.	16,200	non-USW
Cameron Iron Works Inc.	Houston	58,800	non-USW
Carpenter Steel Co.	Reading, Pa.	87,500	non-USW
Carpenter Steel Co.	Bridgeport, Conn.	84,000	Indefinite extension cancellable on 10 days' notice
Columbia Tool Steel Co.	Chicago Heights, Ill.	6,600	non-USW
Continental Steel Corp.	Kokomo, Ind.	420,000	8/14/59—Still negotiating
Copperweld Steel Co.	Warren, Ohio	660,000	8/31/59
Detroit Steel Corp.	Portsmouth, Ohio	1,500,000	Indefinite extension cancellable on 10 days' notice
Edgewater Steel Co.	Oakmont, Pa.	117,600	8/31/59
Empire-Reeves Steel Corp.	Mansfield, Ohio	500,000	8/31/59
Erie Forge & Steel Corp.	Erie, Pa.	284,000	8/31/59
A. Finkl & Sons Co.	Chicago	33,600	non-USW
Firth Sterling Inc.	McKeesport, Pa.	20,040	Day to day extension
Florida Steel Corp.	Tampa, Fla.	43,000	non-USW
Ford Motor Co.	Dearborn, Mich.	1,898,600	non-USW
Granite City Steel Co.	Granite City, Ill.	1,440,000	Indefinite extension
Harrisburg Steel Co.	Harrisburg, Pa.	100,750	11/15/59
Heppenstall Co.	Pittsburgh	55,550	8/31/59
Heppenstall Co.	Philadelphia	157,700	non-USW
Industrial Forge & Steel Inc.	Canton, Ohio	84,000	8/31/59
International Harvester Co., Wisconsin Steel Div.	Chicago	1,200,000	non-USW
Isaacson Iron Works Inc.	Seattle	102,000	non-USW
Jessop Steel Co.	Washington, Pa.	35,800	Open end extension
Jessop Steel Co.	Owensboro, Ky.	183,100	Open end extension
Joslyn Mfg. & Supply Co.	Ft. Wayne, Ind.	37,500	8/14/59—Still negotiating
Keystone Steel & Wire Co.	Peoria, Ill.	475,000	non-USW
Kilby Steel Co.	Anniston, Ala.	34,020	non-USW
Knoxville Iron Co.	Knoxville, Tenn.	38,000	non-USW
Laclede Steel Co.	St. Louis	600,000	8/31/59
Latrobe Steel Co.	Latrobe, Pa.	24,000	8/14/59—Still negotiating
R. G. LeTourneau Inc.	Longview, Tex.	90 000	non-USW
Lone Star Steel Co.	Dallas	800,000	9/7/59
Merritt-Chapman & Scott Corp.	Milton, Pa.	90,000	11/30/59
Mesta Machine Co.	New Castle, Pa.	66,000	non-USW
Mesta Machine Co.	West Homestead, Pa.	105,000	non-USW
Mississippi Steel Co.	Flowood, Miss.	45,000	non-USW
National Forge & Ordnance Co.	Irvine, Pa.	25,000	non-USW
National Steel Corp., Weirton Steel Div.	Weirton, W. Va.	3,300,000	non-USW
Newport News Shipbuilding & Drydock Co.	Newport News, Va.	15,000	non-USW
Oregon Steel Mills	Portland, Oreg.	150,000	Big steel plus 30 days or Nov. 1, whichever is first
Pacific States Steel Corp.	Niles, Calif.	216,000	Indefinite extension
Pencoyd Steel & Forge Corp.	Philadelphia	15,600	5/19/60
Phoenix Steel Corp.	Phoenixville, Pa.	360,000	Extended
Phoenix Steel Corp.	Harrisburg, Pa.	486,760	Extended
H. K. Porter Company Inc.	Birmingham	115,000	9/1/59
H. K. Porter Company Inc.	Huntington, W. Va.	110,000	4/31/60
H. K. Porter Company Inc.	Aliquippa, Pa.	9,600	8/15/59—Still negotiating
Roanoke Electric Steel Corp.	Roanoke, Va.	25,000	non-USW
Simonds Saw & Steel Co.	Lockport, N. Y.	21,600	8/31/59
Southern Electric Steel Co.	Birmingham	66,000	8/31/59
Southwest Steel Rolling Mills	Los Angeles	45,000	9/1/59
Texas Steel Co.	Ft. Worth, Tex.	132,450	non-USW
Timken Roller Bearing Co.	Canton, Ohio	700,000	8/24/59
Union Electric Steel Corp.	Carnegie, Pa.	25,000	9/8/59 or 15 days after big steel settlement, whichever is later
Vanadium-Alloys Steel Co.	Latrobe, Pa.	12,000	non-USW
Vanadium-Alloys Steel Co.	Monaca, Pa.	30,000	8/14/59—Still negotiating
Washburn Wire Co.	Phillipsdale, R. I.	93,000	10/15/59
Wickwire Bros. Inc.	Cortland, N. Y.	32,440	9/30/59
Yuba Consolidated Industries Inc., Western Rolling Mills Div.	Helena, Ariz.	60,000	non-USW

Copper Peace Odds Narrow

There's still some optimism, but outlook for an early settlement is dim. Walkouts close Kennecott. Mine-Mill sets Aug. 20 as date for general strike. Don't look for copper shortage for two to three months

STRIKE CLOUDS are massing over the copper industry. There are still some rays of optimism that a general walkout can be averted, but talks between labor and management haven't indicated that they're any closer to an agreement now than they were on June 30 when most contracts expired.

• **Already Idled**—Operations were halted last week at all facilities of America's largest producer, Kennecott Copper Corp. About 11,500 men walked out. Most are members of the United Steelworkers of America or the International Union of Mine, Mill & Smelter Workers. Idled: Around 33,000 tons of production a month—virtually one-third of U. S. output.

The Mine-Mill also shut down independent mines at San Manuel and Magma, Ariz., last week. Phelps Dodge Corp.'s Laurel Hill, N. Y., refinery, has been inoperable since the USW walked out July 31.

• **Deadline Approaching** — Other copper mining and refining operations remained unscathed as STEEL went to press. But the Mine-Mill, which dominates the industry, has notified its locals that Aug. 20 is the last date they can work "unless a satisfactory settlement has been reached, and is approved."

There may be scattered trouble before then. Locals are authorized to walk out any time before Aug. 20, if they get the green light from national headquarters. Aug. 19 has already been set as the date for a walkout of 5600 workers at Anaconda Co.'s Montana and Utah operations.

• **Strike Odds** — The chances for labor peace boil down to this: The Mine-Mill says it will keep working on a day-to-day basis beyond Aug. 20 only if it looks like rapid progress is being made toward a contract settlement. So far, only one firm proposal has been made and the union's initial reaction was "not enough." That was American Metal Climax Co. Inc.'s offer to workers at its Carteret, N. J., smelter: An across-the-board hike of 4 cents an hour and substitution of a noncontributory pension for the present contributory plan.

Many people in the copper industry believe the offer was too large. That gives you an idea of how far apart labor and management are.

Another factor working against harmony is the question of management's rights. For example, Kennecott's insistence that the union halt such procedures as bad shop practices, payroll padding, and pay for time not worked, in return for wage and fringe benefit gains, is reportedly one of the reasons why the unions struck the big producer. Another was Kennecott's refusal to go along with a Mine-Mill proposal that a clause be inserted in the contract which would allow the union to call a strike at any time.

Wage package demands are probably the single biggest stumbling block. Had Mine-Mill's original demands been granted, they would have cost $1.44 an hour per worker, says Kennecott. Even after demands were pared down in negotiation sessions, the bill came to 50 cents an hour.

Kennecott's offer to the Steelworkers fell far short of that bundle. The package called for gains of 18 cents an hour in wages and fringe benefits over a two year period, plus other concessions such as SUB. While the Steelworkers treated it with disdain, it goes far beyond what some other producers say they are willing to give.

If you try to analyze the situation rationally, copper people say, everything points to a general strike.

• **If Everyone Strikes** — Barring a protracted strike, copper consumers will have little to fear in the way of shortages.

A STEEL survey of large users finds this pattern: The average company is holding a two month to three month supply (cases range from 45 days to four months). About 60 per cent of the users say they have 25 to 50 per cent more than they would normally carry. The other 40 per cent say inventories are at near-normal levels. Quite a few firms say their mill product inventories are not completely in balance—they might run out of one item before another. Stocks are closely in balance with supplies of steel. Where there is an imbalance, it's usually the steel that's in short supply.

Brass mills say they can continue to serve customers normally at least through Oct. 1. Warehouses are well stocked.

• **Prices** — Look for a widespread strike to play havoc with copper prices. Fluctuations have already started. Custom smelters are up to 30 cents and could go higher at any time. Dealer quotations are edging up. It's anyone's guess what primary will do, but many metalmen see a price advance in the offing.

THIS "HALF SPIDER" (diameter: 27 ft; weight: 25 tons) for a waterwheel generator is being welded at the East Pittsburgh, Pa., Works of Westinghouse Electric Corp. When completed, it will be joined with its matching half and installed in one of the thirteen 167,000 kva generators for the $720 million Niagara Power Project, New York State Power Authority

How to End Strike? Here's One Idea

WITH THE steel strike on the threshold of its sixth week STEEL's mail from people with suggestions on how to settle it fairly is mounting. The large majority urge the steel industry to stick to its guns. A small minority want the government to act as an arbitrator. An even smaller minority think the union "should get something" because of "industry profits."

One of the few letters not in any of those categories is from J. J. Jehring (right). As director of Profit Sharing Research Foundation, Evanston, Ill., he, of course, has a special point of view. STEEL prints his comments because they are different.

THE ONLY postwar steel strike settled without some kind of government intervention was the one-day 1955 stoppage. For the record, it appears that labor-management relations in the steel industry are not advancing toward any permanent kind of solution.

One theoretical industrial-relations framework holds that at any given time in a free industrial society, it is possible to find examples of four types of employer-employee relationships:

1. Competition between employer and employee as to the shares in the product of the enterprise.

2. Arbitration—turning to a third party for a decision as to how the results are to be divided.

3. Sharing—agreeing before the production begins as to how the results are to be divided.

4. Co-operation — the situation which exists where workers become owners and they share no matter how the results of the enterprise are divided.

Social science research indicates that the tendency will be for industry generally to move from competition toward co-operation.

With that framework as a road map, we can see that prewar steel labor-management relations were at the competition level—the share was determined by the amount of power each side could bring to bear on the situation. In the postwar period, the relationship moved to the second stage where the government—although in an unwilling fashion—began to assume the role of a semiarbitrator.

Both stages one and two represent the application of power—the group bringing the greatest power to the bargaining table gets the larger share.

Stages three and four, however, are based upon principles of co-operation—each side must co-operate more fully in the production of goods and services in which both will share.

The problem in steel is not how to improve collective bargaining in the conflict situations, but how do we move from the conflict levels to the co-operative levels.

What are the real stumbling blocks to moving to levels of co-operation in steel? Attitudes! Both union and management "attitudes" are opposed to moving to stages of sharing or co-operation — unions cling to outmoded union ideologies and management sticks to its formalized management training system in industrial relations which concentrates upon the conflict aspects and almost totally ignores the co-operative aspects.

As a researcher, I find it interesting to note that there are certain social pressures which are beginning to work on our labor management relations which will probably force them into areas of co-operation.

1. The fact that for a monopolistic union dealing with an oligopolistic industry, the only rational solution is for the union to seek a share of the profits which will not be passed on as added prices. Both the UAW and the IUE are moving toward seeking some form of profit sharing.

2. Automation is another pressure. This gives rise to the need for the workers somehow to seek a share in the benefits derived from the introduction of such devices, and solutions lie along the lines of sharing and employee ownership programs.

3. Inherent superior incentive values of sharing and co-operative programs constitute another pressure. Once installed and effectively operated by several companies in an industrial group, they force other firms to adopt similar programs to remain competitive. This is especially true where there is a free

market. Evidences are already seen in merchandising, electronics, and publishing.

Transition from the "arbitration" to the "sharing" stage won't solve all the problems in the steel industry. Actually, it will create another.

Co-operation in a free market benefits the consumers. Co-operation in an oligopolistic or monopolistic market requires special steps to protect the consumer's interest. This problem lends itself to at least three possible solutions:

1. A management pricing policy aimed at protecting the consumer interest.
2. Lacking this, union pressure to see that the consumer interest is protected and thereby more jobs are created.
3. Or finally, government regulation of prices in oligopolistic and monopolistic markets.

What IAM-UAW Demands

Here's what the International Association of Machinists and the United Auto Workers (after meeting in joint session in Kansas City, Mo.) will demand from the aircraft industry:

1. Higher wages. (The amount will be decided at another meeting late this year.)
2. Severance pay.
3. Relocation pay.
4. The union shop.
5. Increased medical benefits, including catastrophic illness insurance.
6. Life insurance up to a year's average wage.
7. Pensions financed fully by the employer.

SBA Loans Set New Record

A record total of 5582 loans, amounting to $267,042,000, was approved by the Small Business Administration in the fiscal year ended June 30.

Since the loan program began in September, 1953, the administration has granted 25,578 loans for $879,341,000. Small business loans are made by the agency to finance business construction, conversion or expansion; to finance the purchase of equipment, machinery, facilities, supplies or materials, and to supply working capital when financing is not otherwise available.

Salesmen Car Costs Jump to New Peak

IF YOU PAY your salesmen 9 cents a mile to drive their cars on company business, you're paying the most popular rate in the metalworking industry.

That's one of the findings of a new nationwide survey conducted by Wheels Inc., Chicago auto leasing firm.

About 36 per cent of the companies queried now pay their salesmen 9 cents a mile; 23 per cent pay 8 cents; 16 per cent pay more than 9 cents. Lowest rate reported: 6.5 cents, given by only two companies in the survey.

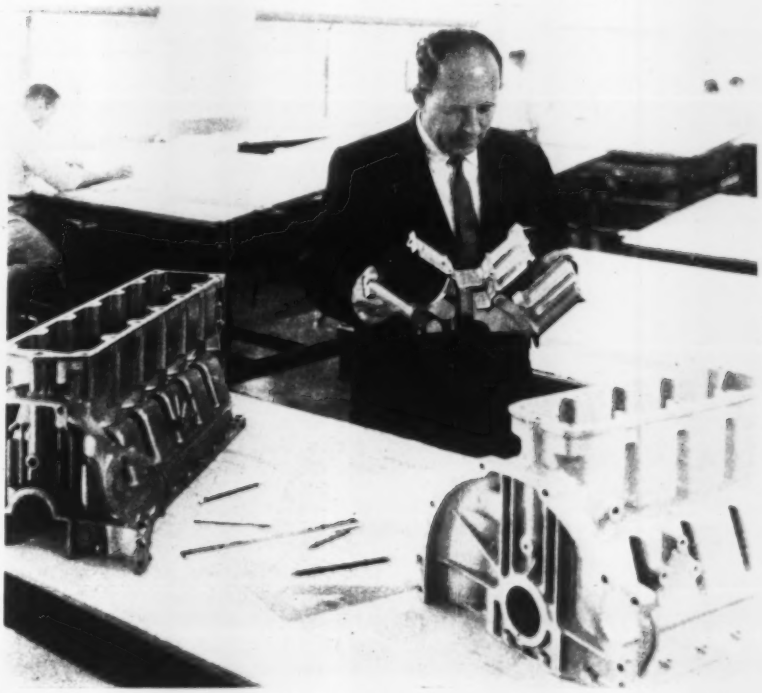
• **What It Means**—It indicates that the cost of keeping your salesmen on the road has reached a new peak.

The national average rate for metalworking is 8.76 cents a mile; for all industries, 8.91 cents. Last year, the national average was 8.22 cents a mile. The 1959 average is 15 per cent higher than that of 1957 (7.72 cents).

Most salesmen averaging 18,000 miles or more a year are paid 8 or 9 cents, while those operating primarily in cities generally get 10 or 11 cents—to compensate for the higher fuel costs of start and stop driving.

A. J. Schoen, president of Wheels, believes that this year's jump in payments reflects the nation's economic recovery. He believes companies are boosting their rates in an effort to hold onto their salesmen, and as added bait in the contest to lure new men.

Rising gasoline and service costs also contribute to the allowance boost.



ALFRED F. BAUER, chief engineer and assistant general manager of Doehler-Jarvis Div., National Lead Co., examines a section of the diecast, eight cylinder, aluminum engine block which he has patented for Doehler-Jarvis. In the foreground are four and six cylinder aluminum blocks also designed and diecast by Doehler-Jarvis. Mr. Bauer's design, applicable to all V-8 engine blocks, eliminates undercuts, projections, and blind passages; has uniform lubricating and cooling passages cast directly into the block. The average aluminum V-8 block weighs 55 lb, about one-fourth the weight of a conventional gray iron block. Aluminum's high thermal conductivity means that smaller water channels and a smaller radiator are possible

How McGraw-Edison Grows

	1930	1941	1957	1958
Number of employees	1,000	1,500	15,000	14,000
Number of plants	3	3	42	42
Total assets	$4,379,000	$6,849,000	$148,000,000	$157,407,000
Number of product lines	4	4	27	29
Sales	$3,990,000	$10,318,000	$256,633,000	$240,893,000
Sales "mix"				
Utilities	—	—	50%	50%
Appliances	55%	55%	50%	50%
Other	45%	45%		

CURRENT SALES of McGraw-Edison Co., Elgin, Ill., are at an annual rate of about $250 million. In 1948, just before a diversification and expansion program was initiated, sales were only $21 million. Today, the company has 30 divisions and manufacturing subsidiaries with 42 factories in 14 states.

All of the company's divisions are autonomous. Each conducts its own research, purchasing, manufacturing, and selling functions. Finance and division results, however, are concerns of central management.

• **Diversification Policy**—The company stated this diversification policy in the 1958 annual report:

"At the end of World War II, we had five basic lines of products —toasters, waffle bakers, food warmers, fuses, and water heaters. Although there was a great pent-up demand for some of these products, we were in a weak position on new items.

"We could have attempted a program of rapid development of new products. This would have entailed a considerable expenditure of funds. The end result was conjectural and we considered it to be hazardous.

"We believed a safer method was to consolidate with sound companies in the electrical manufacturing field, with proven products and proven distribution."

• **Flexible Financing**—There is no strict policy about financing acquisitions; the company is flexible enough financially to use either the technique of stock issuance, or of outright cash purchase—or in some cases a combination. Customarily, the bigger deals are handled with stock and smaller with cash. Raymond H. Giesecke, treasurer, explains that the company's liquid financial position is and has been of such strength that there has rarely been a need for borrowing to finance acquisitions.

McGraw-Edison views the management personnel of companies it acquires in such high esteem that it will make an acquisition only on the basis that management stay on.

• **Ten Years Ahead**—Concerning the kind of company McGraw-Edison expects to be ten years from now if further mergers are undertaken, Max McGraw, president and chief executive officer, comments: "It is not expected that the basic character will be any different than it is today. It is possible that if un-

McGraw-Edison

APPLIANCES

Bersted Div. and Manning-Bowman Div., Boonville, Mo. Acquired 1948. Plants: Boonville, Jefferson City, Kirksville, Macon, and Moberly, Mo. Products: Fans, small appliances, power tools, hair clippers, etc.

Clark Div., and Tropic-Aire Div., Chicago. Former acquired 1929, latter 1951. Plant: Chicago. Products: Water heaters, air conditioning for buses, truck refrigeration systems.

Coolerator Div., Albion, Mich. Acquired 1955. Plant: Albion, Mich. Products: Room air conditioners, space heaters, humidifiers, dehumidifiers, central heating and cooling units, electric heating elements, electrostatic air filters.

McGraw-Edison Co. (Canada) Ltd., Oakville, Ont. (subsidiary). Organized 1934 and 1948. Plant: Oakville, Ont. Products: Miscellaneous small appliances, power tools.

Speed Queen Div., Ripon, Wis. Acquired 1956. Plants: Ripon, Omro, and Wautoma, Wis. Products: Domestic and commercial laundry equipment.

Toastmaster Div., Elgin, Ill. Acquired 1929. Plants: Elgin and Algonquin, Ill. Products: Domestic and commercial toasters and other small appliances, food warmers, and commercial cooking equipment.

usually good opportunities come along, some of the expansion and diversification might be in non-electrical lines but if that were to take place, it would at least be in an allied industry.

"We are not interested in mergers just for the sake of getting larger. We do not seek these mergers; they have practically all come to us.

"We anticipate considerable internal diversification aside from acquisitions and consolidations, particularly as the findings resulting from our renewed emphasis on research make their way into new commercial products."

• **Started in 1900**—McGraw Electric Co. was incorporated in November, 1926, an outgrowth of an electric shop and subsequently an electrical contracting business established in 1900 in Sioux City, Iowa, by Max McGraw when he was only 17.

Executive vice president is Alfred Bersted. Around 1928, McGraw Electric merged with Bersted Mfg. Co., Chicago, which made, among other things, parts for the Victor talking machine. Along about 1932, in the depths of the depression, Mr. Bersted bought his way out of McGraw Electric, including tools, and moved to Fostoria, Ohio, where the firm made products under the Bersted label.

• **Reunion**—In 1948, Messrs. McGraw and Bersted got together again. In 1949, Line Material Industries was acquired. This marked the start of the modern day growth of McGraw-Edison. Mr. Bersted is head of the company's appliance business and has been responsible for bringing out many of the new small appliances.

On Jan. 2, 1957, McGraw Electric and Thomas A. Edison Inc., the firm founded by the great inventor, were consolidated. The company name was changed to that in use today and Charles Edison, son of Thomas A. Edison, was made board chairman.

• **More Research**—One of the major reasons for the consolidation was Edison's new research facilities at West Orange, N. J., which the company intends to use as a basis for all research activities.

Research and development will still be a divisional responsibility, but at West Orange the company believes it has something extraordinary. Basic research in new fields will be one of the major functions of the laboratory and certain types of research will be done there for any company division and probably for outsiders as well.

Divisions and Subsidiaries

UTILITY GOODS

Canadian Line Materials Ltd., Toronto, Ont. (subsidiary). Organized 1923 and 1949. Plant: Toronto, Ont. Products: Pole line hardware and other power distribution equipment, utility goods, street lighting.

Illinois Edison Porcelain Div., Macomb, Ill. Acquired 1953. Plant: Macomb, Ill. Products: Electric porcelain, fuse boxes, etc.

Line Material Industries, Milwaukee. Acquired 1949. Plants: South Milwaukee, Wis. (2); Barton, Wis.; Zanesville, Ohio; Olean, N. Y.; East Stroudsburg, Pa.; Birmingham; Sherman, Tex.; Visalia, Calif. Products: Electrical distribution and transmission equipment.

Pennsylvania Transformer Div., Canonsburg, Pa. Acquired 1952. Plant: Canonsburg, Pa. Products: Power and distribution transformers, voltage regulators.

OTHER

Bussmann Mfg. Div., St. Louis. Acquired 1929. Plants: St. Louis (2). Products: Fuses and fuse receptacles.

J. G. Dickson Div., Pittsburgh. Acquired 1956. Plant: Pittsburgh. Business: Sheet metal fabricating.

Lectromelt Furnace Div., Pittsburgh. Acquired 1956. Products: Electric melting furnaces.

McGraw-Edison Finance Corp., Elgin, Ill. (subsidiary). Organized 1956. Business: Financing.

McGraw-Edison Pan-American Corp., Elgin, Ill. (subsidiary). Products: Exports of regular products to Western Hemisphere countries.

National Electric Coil Div., Columbus, Ohio, including National Electric Service Corp. and National Electric Coil Canada Ltd. (subsidiaries). Acquired 1958. Plants: Columbus, Ohio; Bluefield, W. Va.; Harlan, Ky.; St. Johns, Que. Products: Coils for electric motors and generators.

Pittsburgh Lectrodryer Div., Pittsburgh. Acquired 1956. Plant: Pittsburgh. Products: Atmospheric dryers.

Thomas A. Edison Research Laboratory, West Orange, N. J. Acquired 1957. Business: Research and development.

Thomas A. Edison Industries, West Orange, N. J. Acquired 1957. Includes following subdivisions and subsidiaries: Edison Instrument Div.; Edison Storage Battery Div.; Edison Voicewriter Div.; Edison Wood Products Div.; Measurements Div.; Thomas A. Edison of Canada Ltd. (subsidiary); Thomas A. Edison Ltd. (Great Britain) (subsidiary); Thomas A. Edison International Corp. (subsidiary). Plants: West Orange, Boonton, Belleville, Succasunna, Neptune and Bloomfield, N. J.; Stuyvesant Falls, N. Y.; North Grafton, Mass.; New London, Wis. Products: Batteries, dictating machines, medical gases, juvenile furniture, aircraft instruments, other electronic devices.

Record Opportunities Set

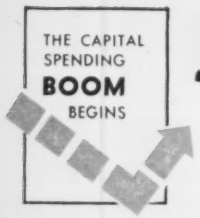
A record 2061 opportunities for private U. S. investment abroad (value: over $2 billion) were published by the Bureau of Foreign Commerce in *Foreign Commerce Weekly* in the year ended June 30. That represents a 73 per cent increase over the 1190 published in 1958.

Machinery and technical know-how investment opportunities for expansion and modernization of existing industry or the establishment of new industry accounted for 60 per cent of the total. Less than one-fifth were for dollars or other exchangeable currency.

The European Common Market increased chances for patent license agreements. Of more than 700 opportunities, almost 70 per cent originated from the Common Market area.

Bliss Sells Toledo Plant

E. W. Bliss Co. will sell its manufacturing facilities in Toledo, Ohio, which have been idle for more than a year. The former press building plant includes a 165,000 sq ft Meehanite foundry, capable of handling 60 ton castings, and a 230,000 sq ft heavy machine shop. Bliss presses will continue to be built and serviced from facilities at Canton, Ohio, and Hastings, Mich.



Joining & Assembly Equipment

YOUR COMPANY is typical if it will buy more joining and assembly equipment during the second half of 1959 than it did in the first half.

STEEL's new semiannual survey of capital equipment buyers (see STEEL, July 13, p. 56) discovers:

• Metalworking will buy 32 per cent more joining and assembly equipment in the second half of 1959 than in the first.

These industries will show the biggest spending increases: Automotive (about 40 per cent), electrical machinery and equipment (about 30 per cent), and metalworking machinery (about 30 per cent). Producers of general industrial machinery (pumps, compressors, elevators, conveyors, industrial furnaces, and others) also will show good gains. Several aircraft firms will invest heavily in new brazing facilities.

• Price fighting prevails among equipment makers.

STEEL asked producers of welding, soldering, and brazing equipment to classify price competition in their industries. About 1 in 3 calls it "mild"; 1 in 10 says it is "a little more severe than normal"; 1 in 3 terms it "rugged"; about 1 in 4 asserts it is "very bad."

Most look for some improvement before yearend. But there's a considerable spread to make up between list and selling prices—especially in welding equipment. One major producer says he bid on a six figure job wherein the spread in prices among five bidders was greater than the price he quoted. "And I wasn't even the highest bidder!" he adds. Another welding equipment maker tells of being underpriced by 20 per cent on orders involving less than ten machines.

• But prices are firming, and you'll pay more by yearend.

Here's what will happen:

• **Arcwelding**—Only one producer told STEEL he would raise prices before yearend. His estimate: 10 per cent. All others said they would absorb any steel price increase that might be made as a result of current labor negotiations. But most look for the price cutting knife to lose its sharpness soon. For some companies, that will have the same effect as a 10 per cent hike.

• **Resistance Welding** — Half the producers of resistance welding equipment queried by STEEL plan to boost quotations within the next six months. Hikes will range from 5 to 10 per cent.

• **Soldering & Brazing**—Half the companies STEEL contacted in this category will boost equipment prices in the next six months. Average hike: 5 per cent. In a couple of cases, it will make up for reductions made during the recession.

• **Special Assembly Machines** — Look for scattered increases after the turn of the year. The range: 3 to 15 per cent. Price competition is rugged in this field.

• Foreign competition is deepening in all segments of the joining and assembly equipment field, though it's not severe in most places yet.

STEEL asked domestic producers of welding equipment to compare the quality of foreign machines with their own. They say the units are comparable, though U. S. makers hold a few technological edges. But prices of foreign units range as much as 30 per cent lower than U. S. machines. Most foreign competition in welding equipment comes from Sweden and Germany. In soldering and brazing equipment, it comes from England and Germany. Those three countries, plus Japan, are threatening U. S. makers of special assembly machines.

Welding Equipment

RESISTANCE: Look for orders for resistance welding equipment this year to approximate $32 million vs. last year's $20.7 million. Second half, 1959, orders will hop up to $17.4 million from the first half's estimated $14.8 million—a 19 per cent gain. This year's second half orders will be 75 per cent better than the $9.9 million worth recorded in the like period of 1958.

ARC: Expect second half orders for arcwelding equipment to exceed those of the first half by 16 per cent. Total 1959 orders will be 30 per cent better than those of 1958.

Last year was the worst in a decade for this industry. Less than 8000 industrial type transformer welders were ordered last year (vs. 11,368 in 1957). Orders for limited input transformer welders set a record—the bright spot in last year's picture.

Orders to Hop Up 32% in Half

Soldering & Brazing Equipment

Expect soldering and brazing equipment makers to pick up at least 15 per cent more orders in 1959's second half than in the first six months. Orders for the full year will tower over 1958's by 27 per cent or more.

Best markets will be the aircraft industry (several firms are planning major brazing programs) and the electrical machinery and equipment industry (it'll order about 30 per cent more of this type equipment in the second half than it did in the first). Other industries that will boost their order rates: Automotive, farm equipment, and general industrial machinery.

Export sales this year will be only slightly better than last year's, producers report. Biggest increase expected: 30 per cent. Largest drop expected: 20 per cent. Average increase expected: 3 per cent.

Special Assembly Machines

You can expect producers of special assembly machines to get about 15 per cent more orders in 1959's second half than they did in the first. That'll give the industry 20 per cent more orders in '59 than in '58.

Producers look for the uptrend to accelerate next year: Most think they'll pick up 20 to 25 per cent more orders in 1960 than this year.

The best markets this half will be the aircraft and automotive industries. Electrical machinery and equipment producers show signs of stronger buying too.

Producers report that order backlogs average about 15 per cent higher than six months ago.

Other Joining Equipment

There's a 19 per cent order increase coming this half for companies making these types of equipment: Electric and pneumatic screw drivers and nut setters, automatic and semiautomatic screw driving, nut running, stud setting, and riveting equipment.

Total 1959 orders will exceed those of 1958 by about 30 per cent. One producer looks for a gain of 100 per cent. Smallest increase expected: 20 per cent.

The average producer expects 1960 orders to exceed this year's by 9 per cent.

Best markets: The auto, appliance, construction, electrical equipment, machinery, and aircraft industries.

• *This is the sixth article in* STEEL's *new semiannual series on the outlook for capital equipment. Predictions are based on a* STEEL *survey of selected companies representing nearly one-third of metalworking's total spending for capital equipment. For this article,* STEEL *also queried producers of joining and assembly equipment. You can get an extra copy of this report by writing: Editorial Service,* STEEL, *Penton Bldg., Cleveland* 13, *Ohio.*

NIKITA KHRUSHCHEV

Cold War: Thaw for Defense Business?

WALL STREET took it hard a week ago today: The Dow Jones average for industrial stocks dropped about 15 points. Is this an indication of what the coming meeting between President Eisenhower and N. S. Khrushchev can mean to the U. S. economy?

Soon after the announcement of the meeting, Defense Secretary Neil McElroy told a packed news conference: "Marginal missiles" will be eliminated from the fiscal 1961 budget (the year beginning July 1, 1960). He was referring to projects long described as marginal, like the Snark subsonic missile and the Mace. But rumors have cropped up in Washington about such advanced fighters as the F-108, supposedly the last fighter to be built until the missiles take over.

Now observers even talk vaguely of a cancellation of such advanced projects as the B-70 chemical bomber. The point: Under the impetus of "peaceful" co-existence, economy minded folks in government are ready to cancel anything that looks like it will cost money. That's why the stock market ran scared last week. In this area, at least, the market represents some of the best thinking of U. S. investors. Government, and everyone else, has been looking for an excuse to cut back defense spending.

A Last Effort Is Assured

But after the fevered brows were sponged off, Washington and economists in New York agreed: A $40 billion budget for defense is not too much. If it isn't placed in missile hardware contracts, then it will later be translated into advanced space projects. Much of the Defense Department budget contributes directly to the space effort. If, in the future, we don't have defense to use for these great expenditures, then we'll probably agree that we must spend a similar amount of money for the race into space. Whatever agreement is possible with the Soviet Union, we know we must push the frontiers of space ahead as fast as possible. It may require a period of transition, as the aircraft industry has undergone since the Pentagon brass decided missiles were able to replace aircraft, but the hardware business will be there for metalworking.

Crux: Don't close up your defense sales division just because Mr. K. and Mr. E. have decided to have a meeting. Indeed, one source in government suggests to STEEL that this sort of quiet would be the best thing possible for the defense industry; it would give Congress, the Defense Department, and the National Aeronautical & Space Administration time to organize their thinking about space projects, so that business for metalworking would arrive faster in the long run than under the present system of compromise between immediate defense needs and the long pull.

Defense Budget Forecast

Just a hint of future defense expenditures is contained in a report from the Committee for Economic Development. Assuming an economy minded Congress and administration for the next eight fiscal years, the CED believes direct military activities of the Pentagon will cost the U. S. public at least $49 billion a year by fiscal 1968. The CED guesses that medium defense spending (on the level of the present Eisenhower administration's activities) would take $51 billion a year by 1968. If the Democrats obtain power, and some of their particularly defense minded stalwarts gain control, the budget for defense could go as high as $54 billion a year. If the Congress and White House of the '60s followed the advice of some of our more adamant defense minded groups (as represented by the so-called Gaither report) the annual budget for defense could hit $64 billion.

Buy American Fight Continues

Sources close to Baldwin-Lima-Hamilton Corp. assure STEEL that the fight to overrule the executive order of 1954 (implementing the Buy American Act) is hotter than ever. It set a 6 per cent differential between bids of foreign and U. S. firms for Uncle Sam's business.

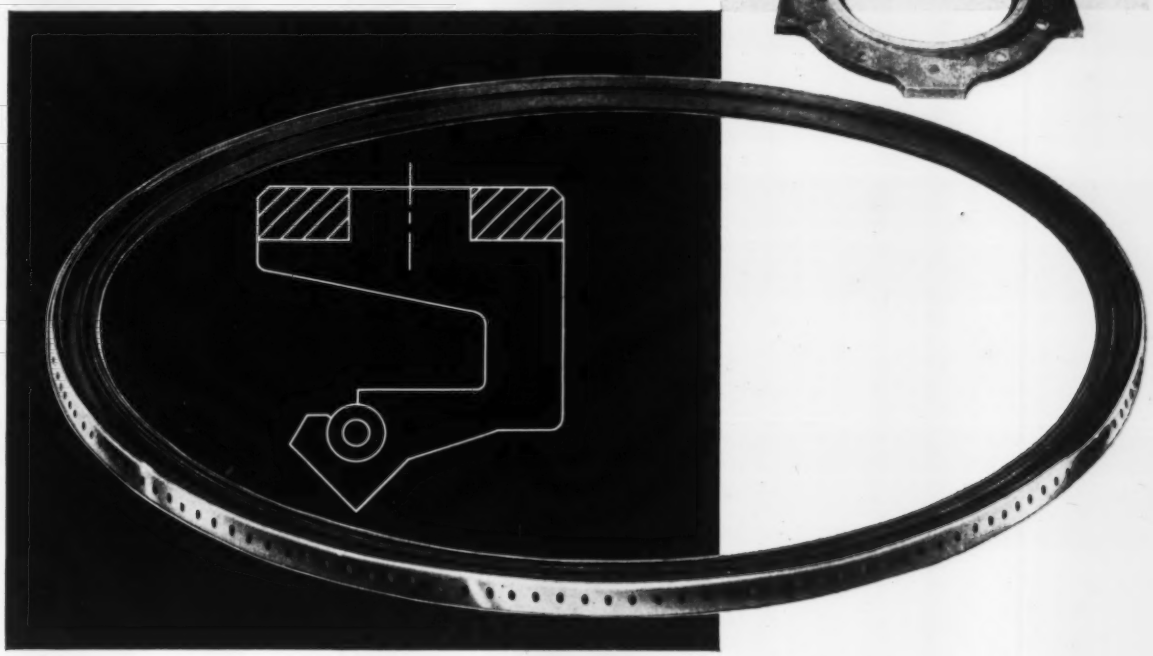
The Army has replied to the comptroller general on a case which called for the elimination of the differential on the contention that the executive order was illegal. (An Army contract award was under discussion.) Yet, say reliable sources, the Army neglected to refer to the domestic firm's charge that the implementation of any differential at all was illegal.

Under the usual Washington procedure, a long time will elapse before there's a ruling but enough people have become interested in the case to assure B-L-H of more than a cursory hearing. More than one senator is known to have an interest in investigating the legality of the White House order. It is not too far fetched to speculate about a full Congressional investigation of the Buy American Act, its usefulness under present world economic conditions, and its legality.

Goes in: *1 minute or less*

Stays in: *6 months or more*

Photo courtesy of
Youngstown Sheet and Tube Company



It's Flex-i-Band – new roll neck seal by C/R

Those are the facts, straight from a hot mill of one of the nation's foremost steel producers. Install this seal in one minute or less, forget it for 6 months or more in rugged hot mill service — much, much longer on cold mill jobs.

More facts: Chicago Rawhide's new Flex-i-Band Seal will not spin in the bore. See that steel O.D.? That's why. It holds the seal tightly in the bore with sure metal-to-metal contact. And the rubber, molded into the perforations cannot shear its bond.

So when your roll necks turn up as high as 5000 surface f.p.m. and the oil side gets hot, you need minimum-wear, maximum life seals to keep out steam, water and scale and keep oil in. Put in C/R Flex-i-Bands the next time you pull the chocks. They go in fast—and *stay in*. Ask your C/R Representative or write us direct.

More automobiles, farm and industrial machines rely on C/R oil seals than on any similar sealing device.

CHICAGO RAWHIDE MANUFACTURING COMPANY
1245 ELSTON AVENUE • CHICAGO 22, ILLINOIS
Offices in 55 principal cities. See your telephone book.
In Canada: Manufactured and Distributed by Chicago Rawhide Mfg. Co. of Canada, Ltd., Brantford, Ontario.
Export Sales: Geon International Corp., Great Neck, New York
C/R PRODUCTS: C/R Shaft and End Face Seals • Sirvene (synthetic rubber) molded pliable parts • Sirvis-Conpor mechanical leather cups, packings, boots • C/R Non-metallic Gears
Copyright 1959 by Chicago Rawhide Manufacturing Company

OIL SEAL C/R DIVISION
CHICAGO RAWHIDE

New "washing machine" makes CLEAN stainless steel

More often than not, titanium-bearing stainless can hike your fabrication costs . . . due to subsurface stringers or banding that cause excessive scrapping of parts. At Eastern, however, these harmful inclusions come out in the "wash."

Eastern's exclusive slag wash melting process produces the *cleanest* titanium-bearing stainless you can buy . . . exceptionally free from non-metallic contaminants . . . and at *no extra cost.* Eastern's new high-capacity slag furnace will meet industry's growing demand for such titanium-bearing steels as 321SW, 19-9DL, A-286, 19-9DX. Which do *you* need—and how fast?

EASTERN STAINLESS STEEL

Baltimore 3, Maryland, U. S. A.

Foundry Total Dips to 6085

THE United States and Canada have 6085 foundries, 235 fewer than were in operation two years ago. Breakdown: 5573 plants in the U. S. (a 3 per cent drop) and 512 Canadian operations (a 10 per cent decline).

Approximately 27 per cent are captive shops.

Trends since 1957 are mixed. There are fewer makers of gray iron, brass and bronze, and aluminum castings, but more plants casting magnesium and zinc. The malleable total is unchanged. Total steel foundries is higher, but if investment casting shops are excluded, there is a decrease.

• **Leading States**—Ohio, California, Pennsylvania, Illinois, Michigan, New York, Indiana, and Wisconsin.

Sand continues to be the primary molding medium, although there are fewer sand foundries than in 1957. Other molding methods, headed by diecasting, have become more widely adopted.

Because some foundries cast more than one type of metal, the data for "total foundries" below do not represent total producers of each metal.

Geographical Distribution of Foundries

(By plants, not companies)

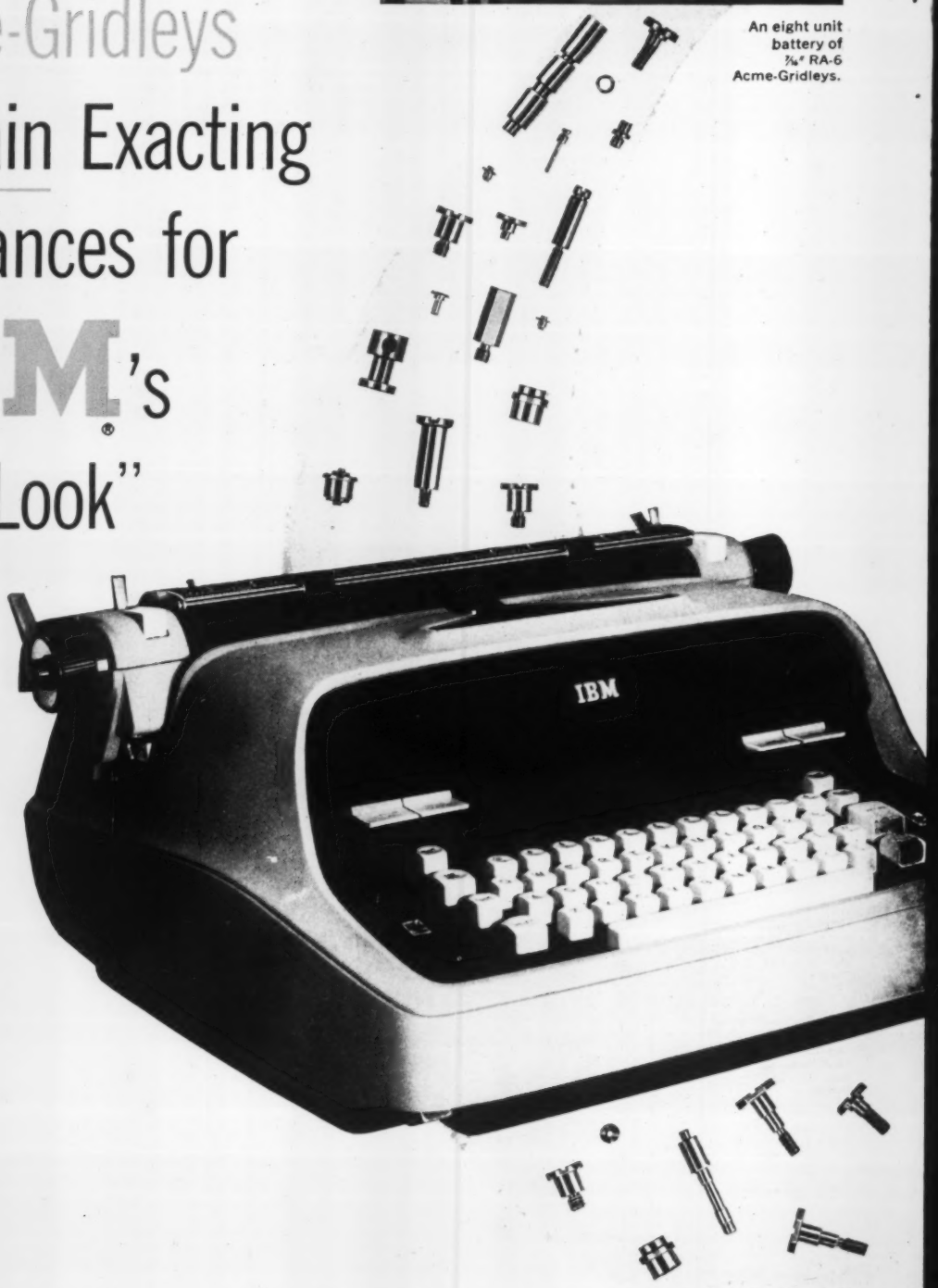
	Totals		Gray Iron		Malleable		Steel		Brass & Bronze		Aluminum		Magnesium		Zinc		Exclusively Nonferrous	
	1959	1957	1959	1957	1959	1957	1959	1957	1959	1957	1959	1957	1959	1957	1959	1957	1959	1957
Alabama	99	98	67	74	2	2	9	9	26	24	48	47	2	1	7	4	28	19
Arizona	11	11	4	6	..	..	2	3	7	7	7	8	1	..	4	3	5	3
Arkansas	24	28	9	10	..	..	1	1	7	9	16	19	..	..	4	5	14	17
California	543	562	113	121	4	4	49	46	221	217	363	375	44	35	110	120	393	405
Colorado	53	58	20	20	..	..	5	6	20	22	34	37	..	3	11	11	32	36
Connecticut	161	160	34	38	6	6	12	9	79	83	98	88	7	7	32	30	112	110
Delaware	8	8	2	2	1	1	3	3	4	4	3	3	..	..	..	1	3	3
Dist. of Columbia	3	4	2	3	1	1	1	1	3	2	3	3	1	1	2	1	1	1
Florida	68	59	19	18	..	..	1	1	40	34	59	51	8	2	17	10	48	41
Georgia	65	69	38	44	..	..	4	4	24	26	35	36	1	1	2	3	24	21
Hawaii	4	..	3	..	..	..	1	..	3	..	4	..	..	..	1	..	1	..
Idaho	7	7	6	6	..	..	1	1	2	2	3	4	..	..	..	1	..	..
Illinois	478	485	136	150	16	15	35	32	150	157	262	263	22	14	110	98	304	306
Indiana	245	250	98	104	6	9	19	11	88	78	118	118	9	10	17	17	130	133
Iowa	81	79	46	48	1	1	1	2	21	21	36	36	3	2	10	10	33	29
Kansas	50	51	24	27	..	..	3	1	14	14	29	28	3	4	3	6	24	24
Kentucky	28	29	18	19	..	..	..	1	12	13	13	12	1	..	5	3	10	10
Louisiana	29	33	16	17	..	..	6	7	10	14	16	17	..	..	2	4	9	11
Maine	19	22	13	14	..	..	..	..	9	14	9	14	1	1	2	3	6	7
Maryland	35	41	15	19	1	1	1	2	18	18	22	19	4	3	3	7	19	20
Massachusetts	226	237	85	86	5	4	13	14	121	132	140	141	9	6	31	29	133	140
Michigan	434	455	141	148	8	8	33	30	135	146	204	203	30	28	100	100	264	277
Minnesota	95	98	46	47	1	1	6	8	30	36	47	48	5	5	15	14	43	42
Mississippi	13	14	9	10	..	..	..	..	6	6	7	9	..	..	1	..	4	4
Missouri	124	130	40	41	1	1	12	12	46	51	70	75	3	2	19	19	75	81
Montana	5	5	5	4	..	..	..	..	4	3	3	1	..	..	..	1	..	..
Nebraska	23	25	10	13	..	..	1	2	12	16	20	19	1	1	3	5	12	12
Nevada	1	1	1	1	..	..	1	1	1	1	1	1	..	..	..	..	..	..
New Hampshire	23	23	9	10	1	1	3	1	13	13	16	16	2	1	4	3	12	11
New Jersey	227	234	65	69	1	1	18	17	101	107	123	123	9	9	43	50	149	152
New Mexico	5	7	1	1	..	..	..	..	5	5	5	6	2	1	..	1	4	5
New York	418	433	121	142	6	7	30	32	194	218	245	254	14	29	87	76	266	264
North Carolina	65	64	48	51	..	..	..	..	40	37	47	47	2	..	4	1	17	14
North Dakota	3	4	3	3	..	..	..	..	..	1	3	3	..	..	..	..	..	..
Ohio	564	577	194	210	16	16	41	36	204	216	293	295	22	21	79	69	330	327
Oklahoma	49	53	19	25	..	..	1	2	25	22	34	30	..	2	6	4	29	27
Oregon	61	58	25	23	..	..	8	7	27	25	29	31	2	2	14	12	29	29
Pennsylvania	503	543	229	253	14	15	63	66	216	236	239	239	10	11	51	51	226	235
Rhode Island	50	40	11	10	2	1	1	..	19	16	21	20	3	2	12	10	38	28
South Carolina	22	22	18	17	..	..	1	1	17	19	17	19	..	1	1	..	4	6
South Dakota	4	4	3	3	..	..	..	..	2	1	3	2	..	..	..	..	1	..
Tennessee	72	78	53	55	..	..	2	3	27	31	34	32	3	1	8	5	19	23
Texas	171	168	72	69	2	1	18	16	82	82	109	103	6	4	32	28	88	86
Utah	16	17	13	14	..	..	2	1	8	6	6	6	..	..	1	..	3	3
Vermont	12	16	12	14	..	..	..	..	3	4	3	5	..	..	..	1	..	2
Virginia	47	51	37	42	..	..	4	4	29	31	28	31	2	1	6	4	10	9
Washington	71	73	32	34	1	1	17	18	37	40	44	45	4	3	15	14	32	31
West Virginia	30	31	14	16	1	1	2	2	14	17	9	11	..	..	1	1	13	12
Wisconsin	228	243	95	108	11	11	23	24	85	86	112	118	4	4	27	29	105	111
Wyoming	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Total U. S.	5,573	5,758	2,094	2,259	108	109	454	437	2,261	2,363	3,090	3,111	240	218	902	864	3,102	3,127
Alberta	24	..	14	..	..	..	3	..	12	..	15	..	..	..	3	..	10	..
British Columbia	49	..	23	..	2	..	7	..	26	..	27	..	1	..	6	..	23	..
Manitoba	20	..	13	..	..	..	2	..	6	..	9	..	..	..	3	..	6	..
New Brunswick	9	..	7	..	..	..	..	..	6	..	6	..	..	..	2	..	2	..
Nova Scotia	17	..	14	..	..	..	2	..	10	..	8	..	..	..	3	..	2	..
Ontario	247	..	119	..	11	..	17	..	114	..	135	..	7	..	33	..	111	..
Prince Edward Island	4	..	3	..	..	..	1	..	2	..	1	..	..	..	..	..	..	..
Quebec	131	..	73	..	2	..	11	..	55	..	72	..	5	..	16	..	49	..
Saskatchewan	7	..	6	..	..	..	..	..	5	..	7	..	..	..	..	..	1	..
Newfoundland	4	..	4	..	1	..	1	..	4	..	4	..	..	..	..	..	..	..
Total Canada	512	562	276	319	16	15	44	43	240	251	284	293	13	16	66	59	204	212
U. S. & Canada	6,085	6,320	2,370	2,578	124	124	498	480	2,501	2,614	3,374	3,404	253	234	968	923	3,306	3,339

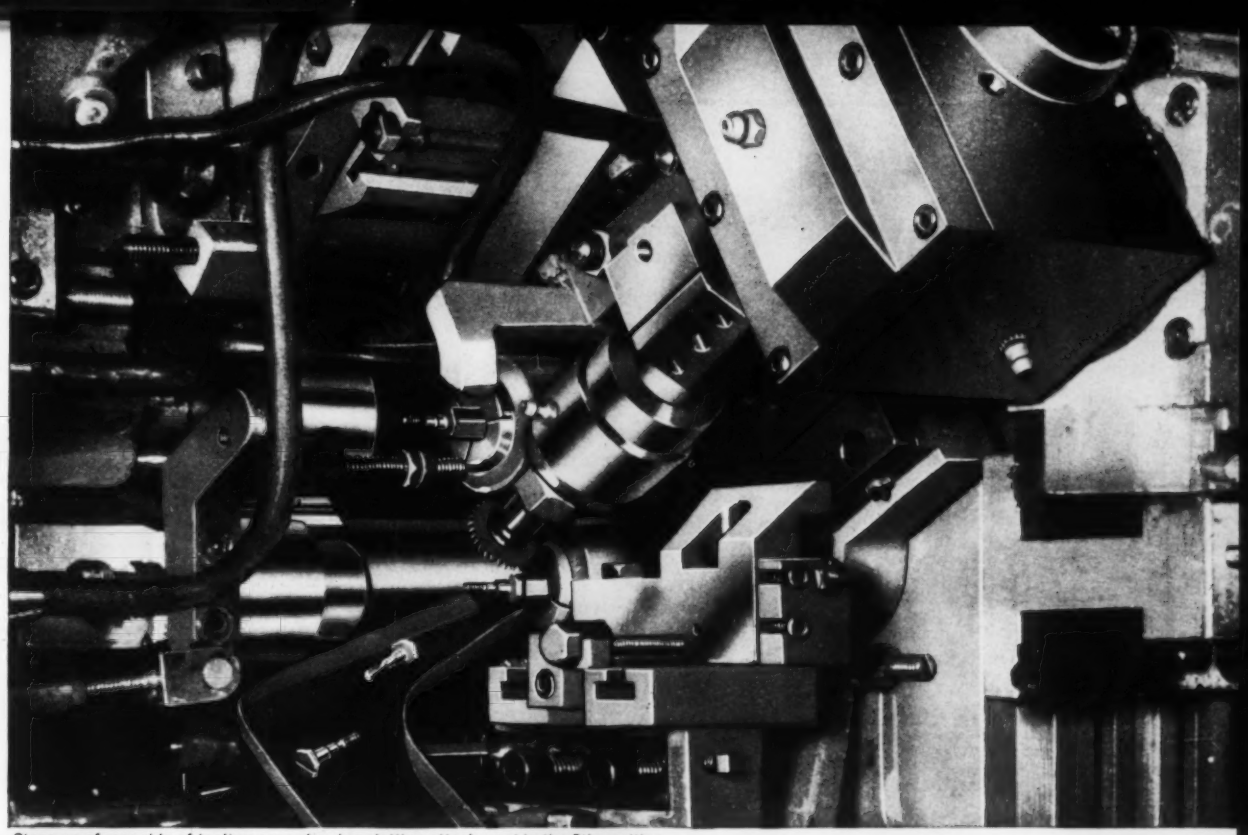
Source: Penton's Foundry List, prepared by FOUNDRY Magazine.

First Precision Component
in the Run . . . or Last

An eight unit battery of ¾" RA-6 Acme-Gridleys.

Acme-Gridleys Sustain Exacting Tolerances for IBM®'s "New Look"





Close-up of rear side of tooling zone showing slotting attachment in the 5th position.

At IBM's modern Lexington, Kentucky plant, twenty Acme-Gridley 7/16" six spindle automatics are mass-producing the small to miniature parts for their sleek new electric typewriter. They help to provide IBM with greater *sustained* accuracy at lower cost than other comparable machines.

The precision components are held to closely controlled tolerances of .0005 t.i.r. These limits apply to the last piece in the run as well as the first, and consistent accuracy is maintained with less machine adjustment than ever before realized. Sustaining the closely controlled tolerances of these parts completely minimizes costly rejections during exhaustive quality control checks of the completed units. Inspection time is greatly reduced.

IBM has also found that the wide-open tooling zone of their 7/16" Acme-Gridleys permits much greater latitude in tooling up for complicated operations performed in a single set-up. This, plus the lasting accuracy of direct camming and the flexibility of independently operated toolslides, makes this newest member of the Acme-Gridley family a profitable asset to IBM's modern production line. Write for Bulletin MRA-58.

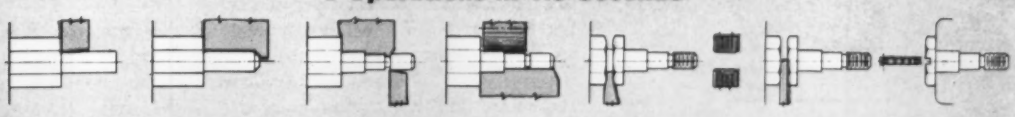
Pioneer in Circumferential Automation

National Acme

The National Acme Company
189 E. 131st Street
Cleveland 8, Ohio

Sales Offices: Newark 2, N.J.; Chicago 6, Ill.; Detroit 27, Mich.

9 Operations in 4.9 Seconds



6. Rough Turn Front End

1. Rough Form and Chamfer Front End

2. Finish Form Two Diameters Finish Turn Thread Diameter

3. Shave Three Diameters

4. Breakdown for Cutoff–Thread

5. Cutoff–Pickup and Slot

Ten Ways Effective Inventory Control Can Benefit You

1. Improves customer service.
2. Aids production cost cutting through better utilization of manpower and equipment.
3. Helps you take advantage of better quantity discounts in purchasing.
4. Minimizes stockouts and resultant downtime on expensive machinery.
5. Minimizes loss of surplus parts as result of design changes and shifting demand.
6. Cuts cost of carrying inventory, freeing capital for more productive uses.
7. Minimizes excessive inventory swings.
8. Prevents overstatement or understatement of profits at yearend.
9. Gives top management quick and accurate analysis of any stock situation at any time.
10. Provides treasurer with accurate data for making tax payments on most suitable basis.

THE MANAGER of a small metalworking company thought he was showing a profit of $100,000. Then he took physical inventory. A $150,000 writeoff more than wiped out his profits.

What he needed was effective inventory control.

• There is no mystery about this management tool. It depends upon accurate statistical information of the company's operations (some of the kinds needed are listed on Page 59).

It starts with a sales forecast—the better the forecast, the better the stock control. If proper goals are set and tested methods are employed, inventory control will lead to the right amount of the right material at the right place at the right time at the right cost.

With the five "rights" working in your favor, the savings can be great. Howard A. Gay, vice president of Cincinnati Milling Machine Co., Cincinnati, points up the dollar benefits. "We believe it costs us about 20 per cent a year to carry inventory . . . Hence, a $5 million reduction in inventories can put something near $1 million of profits, before taxes, into the till."

Many experts in this field feel that the dollar gains are secondary to the less tangible benefits, such as reduced downtime from stockouts and more efficient customer service. (See checklist above.)

• Management must decide how often it can afford to have stockouts without seriously hurting its competitive position and then find the inventory level which will support that decision.

Inventory experts claim the best way to arrive at that level is through knowledge of what is your most economical lot size (or economic order quantity—EOQ) for either making or buying a particular part. The concept is not new, but management consultants feel that it is too often overlooked. It attempts to strike a balance between the cost of acquisition and the cost of maintaining stocks. Such knowledge also helps in determining the reorder level.

Remington Rand Div. of Sperry Rand Corp., New York, says three main formulas are in common use —Camp, Norton, and Davis—but they all involve both consumption

and cost factors.* The variations on those formulas are limited only by the amount of accurate data you can develop.

One of the big drawbacks of the EOQ formula is the fact that you run into square root signs at every turn. But the experts point out that any good textbook on inventory control can help clear up some of the difficulties. Or they recommend consultation with a good management counselor.

For the less mathematically minded, at least five tools are available which will eliminate the time consuming arithmetic, although the solutions will not be as accurate. Once the variable cost items have been established, a trained mathematician or management consultant can prepare computing tables, straight line graphs, logarithmic charts, or nomographs which give values roughly equivalent to those obtained by working the formula. Or you can buy an economic order quantity slide rule, either straight or round, such as manufactured by Van D Mark, Mt. Clemens, Mich.

• If your inventory problem is complex or if you want the maximum in control, check into buying or renting an electronic computer.

Many companies in the medium or large category have enough data processing work to make that step economical. If you don't, it may be wise to check into the use of a computer center for special inventory problems. (Officials at Remington Rand feel that service centers are not practical for day to day problems. There is too much lag time.)

One of the dangers of using high speed data processing equipment, says A. C. Fuller, management consultant at McKinsey & Co. Inc., New York, is treating all inventory items alike. "Look at your inventory by pieces," he advises. That focuses attention on the major dollar or critical items. (Most inventory men say that 15 per cent of your stock accounts for 85 per cent of your dollar investment.) You can afford to carry heavier stocks of the bolt.and nut variety of items, but overstocking high cost items not only involves too much capital but also increases the danger of high obsolescence.

Cook Bros. Equipment Co., Los Angeles custom builder of vehicles, using a small IBM accounting department, has set a breakoff point of $10 in handling its inventory. The company prepares a weekly recapitulation of inventory, or a purchasing guide. Items costing less than $10 are ordered automatically as the guide indicates. But parts costing more are tied in carefully with the periodic sales forecast.

• If you don't feel you can economically use electronic systems, there are several economical mechanical approaches which can still save you time and money on inventories.

Most of these utilize a tub file—a drawer or box containing a card for each item with all necessary information punched or typed on it. One example is the Royal McBee Corp.'s Keysort master decking system. Standard Duplicating Machines Corp., Everett, Mass., uses this method to control inventories, production processes, and payroll accounting.

The cards have a series of holes around the edges. The holes are notched according to a code so that when a long needle is passed through a deck, the notched cards fall into place for quick sorting and analysis. The system, which costs Standard Duplicating only $500 to $1000 a year, has cut posting time from a matter of days to a couple of hours and has resulted in accurate maintenance of inventory at what company officials consider "just the right point."

• If you do not have the required knowledge of the cost factors listed, you can get them through a technique called operations research.

Management consultants at Ernst & Ernst in Cleveland say that approach can be used equally well by small or large companies. A research team, either of your own or supplied by outside organizations, samples and analyzes mathematically the myriad of items which are stocked, the history of the issues, and purchases of the items over a number of years. The theory of the method is based on the mathematics of probability.

• Regardless of the method you follow, it should be flexible.

No formula or machine can take the place of management experience and decisions. For instance, management alone can make the decision on whether to build stocks of a certain commodity, such as steel, in anticipation of a price rise.

Whatever decisions are made, they should be backed up by some statistical knowledge of costs. As one consultant told STEEL: "Even the minimum statistical approach is better than none at all."

• An extra copy of this article is available until supply is exhausted. Write Editorial Service STEEL, Penton Bldg., Cleveland 13, Ohio.

***The basic formula is:**

$$Q = \sqrt{\frac{2AB}{I}}$$

where
Q is the economic order quantity in dollars;
A is annual usage in dollars;
B is cost of an order in dollars;
I is cost of carrying inventory as a decimal..

You Should Consider These Factors for Most Effective Inventory Control:

1. Monthly, quarterly, or annual usage.
2. Price trends of inventoried items.
3. Interest on capital tied up in stock.
4. Insurance.
5. Taxes
6. Leadtime.
7. Chances of obsolescence.
8. Stock deterioration.
9. Storage costs.
10. Availability of storage facilities.
11. Total cost of ordering.
12. Shipping costs.
13. Material handling.
14. Inspection of incoming shipments.
15. Quantity discounts.
16. Cost of paying bills.
17. Cost of stockouts.
18. Demand cycles.

CREATIVE ENGINEERING ASSURES THE QUALITY OF EVERY HYATT BEARING!

The most modern equipment has been utilized by HYATT engineers to help HYATT's skilled craftsmen produce the finest cylindrical bearings in the industry. The end result? Mass production of HYATT Hy-Roll bearings offering you custom-grade quality! *For maximum performance per bearing dollar, insist on . . .*

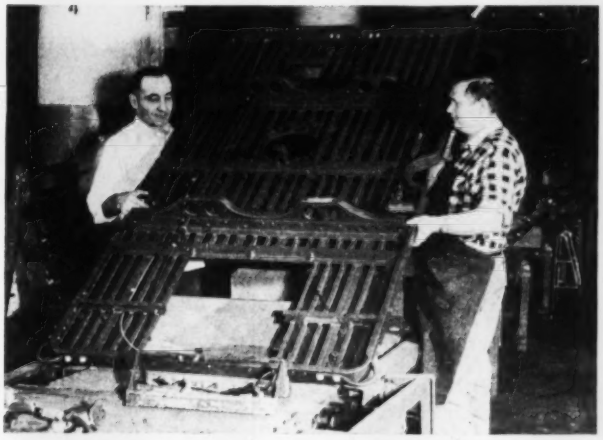
HYATT ***HY-ROLL BEARINGS*** **FOR MODERN INDUSTRY**

HYATT BEARINGS DIVISION • GENERAL MOTORS CORPORATION • HARRISON, NEW JERSEY

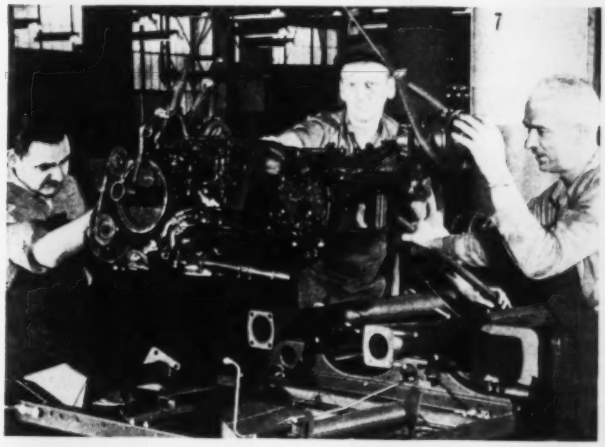
Available through United Motors System and its Independent Bearing Distributors

NO BEARINGS carry radial loads like cylindrical bearings . . .
and NOBODY knows them like HYATT

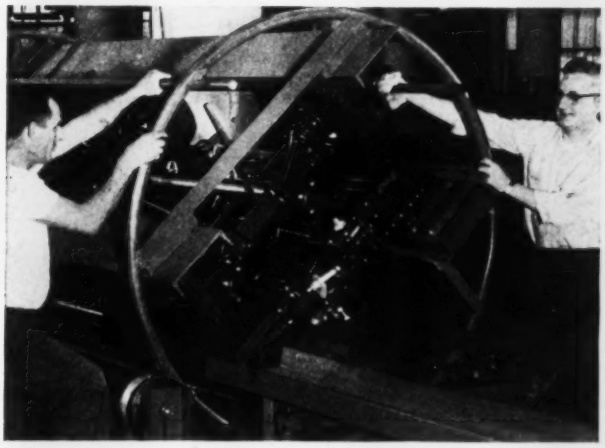
How Willys Makes Mechanical Mules



SMALLEST ASSEMBLY LINE in the industry is in a corner of Willys Motors Inc.'s, Toledo, Ohio, plant. It's used to build up the 900 lb Mechanical Mule for the armed forces. Here the 95 x 46 in. magnesium body platform is laid down while tubular frame members and other parts are fastened to it. Wheelbase is 57 in. The Mule is 119.2 in. long



THE ALUMINUM ENGINE is air cooled, has four cylinders, opposed. It's dropped into place at the rear of the vehicle. Displacement is 53.5 cu in. Compression ratio is 6.5:1. The 17 hp engine will pull the Mule and a 1000 lb load up 60 per cent grades at speeds from 1 to 25 mph. The vehicle has four wheel drive and no differential. Positive four wheel braking is done directly off the propshaft



THIS TURNOVER FIXTURE flips assembled Mules right side up. They're only 27.5 in. high, but have 11.6 in. road clearance. Notice the clutch and brake controls at the front. The steering wheel is mounted over them. It can be folded flat so a soldier can operate the Mule by walking or crawling behind it

(Material in this department is protected by copyright, and its use in any form without permission is prohibited.)

AFTER PAINTING, the vehicles are packed for shipping. Mules roll on 7.50 x 10 in. tires inflated to 12 lb. Wheels are 5 lb magnesium castings. Over 17.5 per cent of the vehicle's dry weight is composed of magnesium. The transmission, combined with the rear axle, has three speeds and reverse with two ranges. Willys has had $9.5 million worth of contracts to engineer, develop, and build the Mule. Latest contract is for the Marine Corps

DELIVERED TO UNCLE SAM, the Mule is listed as the M-274 ½ ton weapons carrier. It's mostly used by airborne troops as a cargo or litter carrier and as a mount for these 106 mm recoilless rifles. Its 79 cu ft package means 20 Mules can be loaded into a cargo plane. So far, the Army has received about 1700 Mules. They're the first in a family of platform type vehicles Willys is developing for the armed services

Exhaust Notes

• Chrysler Corp. and the St. Louis-San Francisco Railroad have started shipping passenger cars by piggyback. The method enables Chrysler to send out 80 cars at a time from its staging areas to regional dealers.

• Chrysler reports it's expanding its supplier network. Five years ago the company had less than 11,000 venders. Last year, it had 13,471 suppliers taking 60 cents out of every Chrysler sales dollar. (About 70 per cent are firms with less than 100 employees.) Michigan accounts for 4828 of the total, 1697 are in Ohio, and 1324 are in New York. Indiana claims 1039; California, 879; Illinois, 865; and Pennsylvania, 751. The rest are scattered among the other states.

• Engineers must accept the challenge of making less water do more work in manufacturing processes, asserts Robert Critchfield, GM vice president. He points out that water conservation has assumed critical proportions as industry has expanded. In 1957, for instance, GM used 72 billion gallons of water. If no conservation plans had been in effect, Mr. Critchfield claims the total would have been over 100 billion gallons.

• University of Michigan engineers are casting about for ways to make man's greatest invention, the wheel, more efficient. They hope to improve its off-the-road use by collecting scientific data that show that diameter, widths, and surface shapes work best under different terrain, soil, and weather conditions. The UM engineers hope to come up with formulas that can be used to predict performance.

• Goodyear Tire & Rubber Co. will build a $7 million tire plant in France. This will boost Goodyear's overseas tiremaking plants to 29 and increase its total world-wide manufacturing operations to 58.

U. S. Auto Output

Passenger Only

	1959	1958
January	545,757	489,515
February	478,484	392,132
March	576,085	357,048
April	578,825	316,594
May	546,817	349,613
June	558,026	337,446
July	551,200†	321,017
7 Mo. Totals	3,835,194	2,563,365
August		180,447
September		130,460
October		261,701
November		514,152
December		593,920
Totals		4,244,045

Week Ended	1959	1958
July 11	123,147	73,062
July 18	127,502	85,533
July 25	124,446	85,519
Aug. 1	122,518	62,846
Aug. 8	106,350†	65,614
Aug. 15	80,000*	59,677

Source: *Ward's Automotive Reports.* †Preliminary. *Estimated by STEEL.

CASE HISTORIES

Exclusive Sentri-Seals effectively seal out foreign materials at temps up to 225° F for extended periods—up to 350° F for shorter periods. Made of Buna-N, they are compatible with silicone, petroleum and diester lubricants.

Photo courtesy: Thor Power Tool Company

Bearings Seal Out Abrasives...Allow Cool Operation In 21,600 R.P.M. Grinder!

CUSTOMER PROBLEM:

Tool manufacturer requires bearing design that will seal 21,600 r.p.m. grinder from abrasives . . . yet heat must be minimized for operator comfort since tool is hand held.

SOLUTION:

N/D Sales Engineer recommended a group of four New Departure integrally enclosed bearings . . . some with Sentri-Seals. These precision ball bearings successfully shut out microscopic grinding abrasives. And, even with such positive sealing, the virtually friction-free New Departures help keep the temperature low enough for comfortable hand operation. They're sealed and lubricated for life . . . promising trouble-free ball bearing performance without the added burden of periodic maintenance.

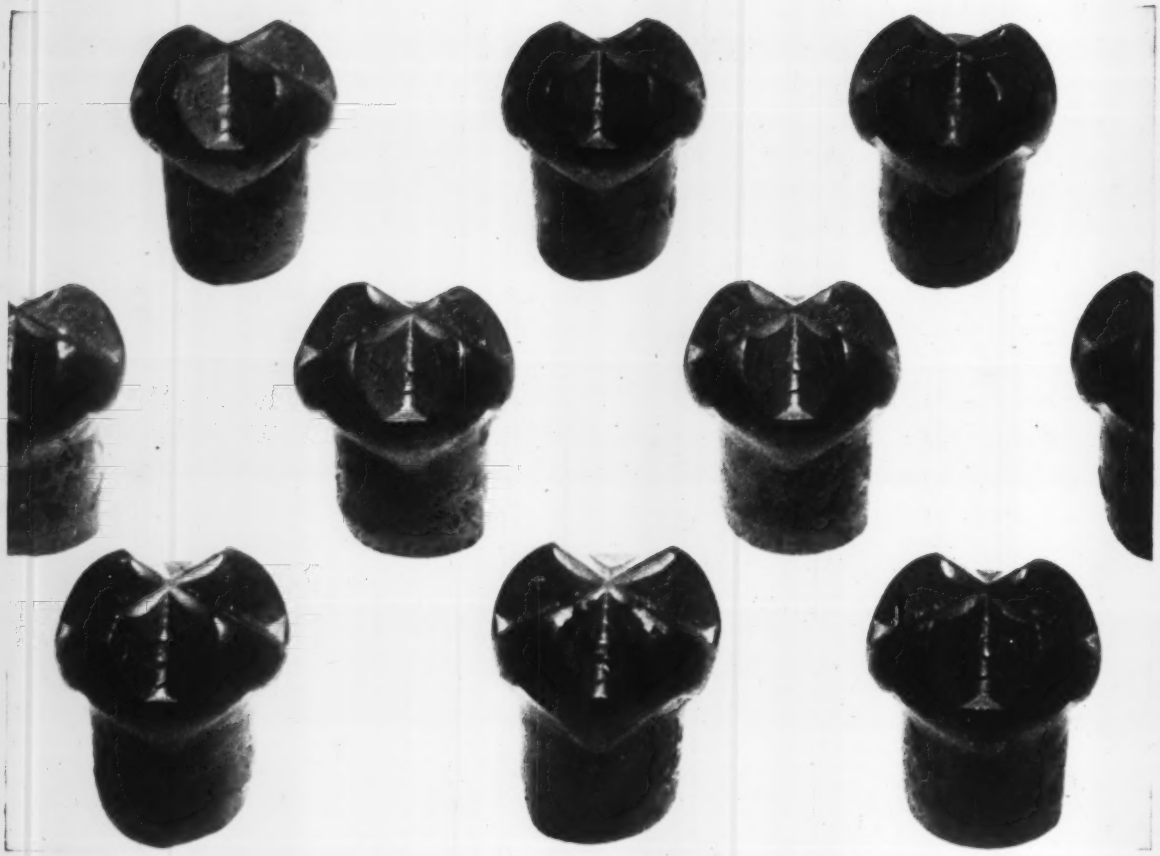
For immediate analysis of your current ball bearing problems, call the New Departure Sales Engineer in your area or write Dept. T-8.

Replacement ball bearings available through United Motors System and its Independent Bearing Distributors

NEW DEPARTURE

DIVISION OF GENERAL MOTORS, BRISTOL, CONN.

NOTHING ROLLS LIKE A BALL



It actually costs less to get uniform forged quality like this

THIS is an actual unretouched photo of rock bit forgings made from Timken® forging bars steel. It costs less to get this uniform forged quality when the steel is uniform. And Timken steel doesn't vary in structure, chemistry or dimension from heat to heat, bar to bar, order to order. You don't have to interrupt to make costly adjustments when you forge with Timken steel.

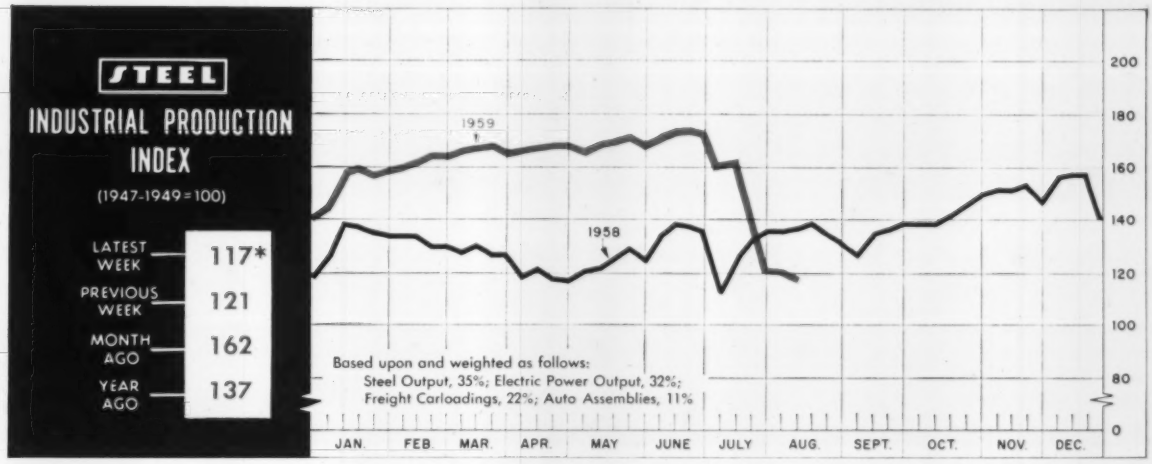
We take *extra* quality control steps to make Timken electric furnace fine alloy steel as uniform a steel as you can buy. For example, the Timken Company was the first U.S. steel maker to use the magnetic stirrer to keep molten alloys equally distributed, work slag constantly and keep temperature uniform. Ours was the first direct-reading spectrometer to insure exact composition down to the instant the furnace is tapped. What's more, The Timken Company's unique method of handling orders individually enables us to target procedures to meet your end-use requirement.

Why not insure a better forged product and save money doing it? Specify Timken fine alloy steel—the steel that's uniform! The Timken Roller Bearing Company, Canton 6, Ohio. Cable: "TIMROSCO". *Makers of Tapered Roller Bearings, Fine Alloy Steels and Removable Rock Bits.*

WHEN YOU BUY TIMKEN STEEL YOU GET:

1. Quality that's uniform from heat to heat, bar to bar, order to order
2. Service from the experts in specialty steels
3. Over 40 years experience in solving tough steel problems

TIMKEN® *Fine Alloy* STEEL



*Week ended Aug. 8.

Economy Buoys Up Production Index

BUOYED UP by a still humming industrial pace, STEEL's industrial production index yielded only a preliminary 4 points in the week ended Aug. 8 to the twin depressants of steel strike and model year runouts in the auto industry.

General business activity, coupled with summer temperatures, pushed electric energy output to a new record for the year at 13,775 million kilowatt-hours. Heavy seasonal consumption can be expected to keep electric consumption high through the summer at least.

Revenue freight carloadings, although depressed by an estimated 150,000 cars a week in the nationwide steel walkout, rallied in the last week of July to top the previous week by more than 8000 cars. Heading the week's rise were loadings of grains, miscellaneous freight and less than carload shipments. Total loadings ran more than 12 per cent below last year's levels.

Phasing out 1959 model lines, auto and truck builders began the annual slowdown which will become a production trickle in coming weeks.

• **Construction Volume Up** — Heavy construction contract awards for the first week of August rose to $411.7 million, lifting the total to date to $13.2 billion, reports *Engineering News-Record*. The level is 5 per cent above comparable weeks of 1958.

Though both private and public awards rose from the preceding week, they slipped below the volume of a year ago. The week's private contracts of $197 million compare with $212.6 million in 1958, although private industry continues to bolster this year's construction volume.

In contrast, among public projects only waterworks, sewers, and bridgework are moving into contractors' hands in greater volume this year than last. Roadwork, the biggest public source of construction in recent years, is being held up by

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1,000 net tons)[2]	340[1]	318	1,632
Electric Power Distributed (million kw-hr)	13,700[1]	13,775	12,619
Bituminous Coal Output (1,000 tons)	7,195[1]	7,240	7,715
Crude Oil Production (daily avg—1,000 bbl)	6,800[1]	6,808	6,545
Construction Volume (*ENR*—millions)	$411.7	$331.5	$514.0
Auto, Truck Output, U. S., Canada (*Ward's*)	117,415[1]	142,614	81,066
TRADE			
Freight Carloadings (1,000 Cars)	530[1]	544	619
Business Failures (Dun & Bradstreet)	252	245	271
Currency in Circulation (millions)[3]	$31,925	$31,890	$31,170
Dept. Store Sales (changes from year ago)[3]	+6%	+5%	+3%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$24,169	$24,368	$22,486
Federal Gross Debt (billions)	$288.5	$289.3	$274.6
Bond Volume, NYSE (millions)	$28.0	$28.6	$30.4
Stocks Sales, NYSE (thousands of shares)	12,768	15,069	18,523
Loans and Investments (billions)[4]	$105.5	$105.9	$93.5
U. S. Govt. Obligations Held (billions)[4]	$30.2	$30.7	$32.0
PRICES			
STEEL's Finished Steel Price Index[5]	247.82	247.82	245.03
STEEL's Nonferrous Metal Price Index[6]	217.4	217.5	199.4
All Commodities[7]	119.2	119.2	119.2
Commodities Other than Farm & Foods[7]	128.2	128.2	126.1

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1959, 2,831,486; 1958, 2,699,173. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-39=100. [6]1936-39=100. [7]Bureau of Labor Statistics Index, 1947-49=100.

WARD STEEL CO.

We specialize in FINISHED STEEL BARS—TUBES—STRIP

PROMPT WAREHOUSE SERVICE ONLY

Most Complete Stock in America of BLUE TEMPERED SPRING STEEL

We believe that the way to sell is to carry a stock which permits satisfying any reasonable warehouse demand.

87A Rindge Ave. Ext. Phone UN 4-2460
CAMBRIDGE 40, MASS.

Branch:
3042-3058 W. 51st Street, CHICAGO, ILL.
Phone: Grovehill 6-2600

COVERED HOT TOP BRICK
INGOT MOLD PLUGS

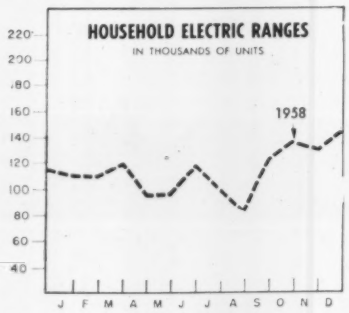
EUREKA
FIRE BRICK WORKS
MT. BRADDOCK, FAYETTE CO., PA.
DUNBAR, PA. BR-7-4213

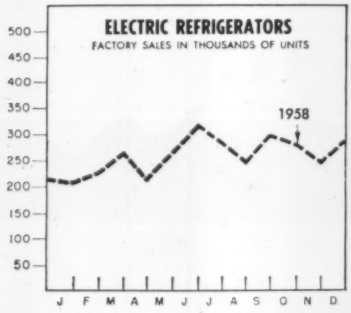
600
AIR-CONDITIONED
Guest Rooms

NOW you can be sure of an air-conditioned room when you come to Baltimore! Teletype: BA 263.

The Lord Baltimore HOTEL

THE BUSINESS TREND





Total Factory—Sales—Units

	1959	1958	1957
Jan.	120,800	109,000	144,500
Feb.	134,600	108,700	127,700
Mar.	172,600	117,900	139,400
Apr.	136,100	95,600	107,200
May	133,400	96,000	93,600
June	151,400	116,800	102,300
July	.....	98,500	88,700
Aug.	.....	81,400	85,800
Sept.	.....	121,800	124,800
Oct.	.....	135,500	120,400
Nov.	.....	129,000	116,800
Dec.	.....	143,900	113,800
Totals	.....	1,354,100	1,365,000

National Electrical Mfrs. Assn.

Charts copyright, 1959, STEEL.

	1959	1958	1957
Jan.	256,200	206,100	305,400
Feb.	306,200	227,800	298,700
Mar.	333,700	261,100	309,300
Apr.	301,000	210,800	281,600
May	308,200	262,900	303,700
June	361,000	316,300	305,100
July	.....	279,700	318,000
Aug.	.....	245,900	240,500
Sept.	.....	295,800	265,200
Oct.	.....	277,900	261,500
Nov.	.....	245,500	246,400
Dec.	.....	286,900	214,600
Totals	.....	3,116,700	3,350,000

National Electrical Mfrs. Assn.

uncertain federal aid financing.

Private home building remains the brightest aspect of the construction market. This week's $94.8 million in awards lifts the year to date close to $3 billion, 18 per cent above a year ago.

Industrial building of $42 million tops the preceding week but falls well below the year ago period. This pares the margin of the year to date to 38 per cent compared with 45 per cent in the previous week. It makes industrial building still the fastest expanding construction market.

• **Truck Tonnage Too**—Intercity truck tonnage, for the week ended Aug. 1, ran 12.3 per cent above loadings for the comparable week of 1958 and 2.7 per cent higher than the week ended July 25, says the American Trucking Associations Inc. Based on a weekly survey of 34 metropolitan areas, the report reflects tonnage handled at over 400 truck terminals.

San Francisco, the first city to be affected by strikes in the West at this time a year ago, reported terminal tonnage more than seven times that of the 1958 week. Sizable increases, more than 25 per cent each, were also reported in Omaha, Nebr.; Memphis, Tenn.; Detroit, and St. Louis.

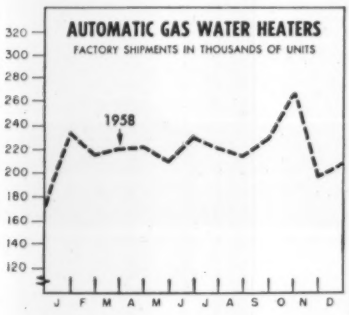
Purchasing Agents 'Coast'

Purchasing executives, surveyed by the National Association of Purchasing Agents, describe their businesses as "coasting" until a steel strike settlement is reached.

Buyers are avoiding any major inventory accumulation, says NAPA, as well as avoiding extended forward purchase commitments. In general, they are buying only what they need to meet current production schedules.

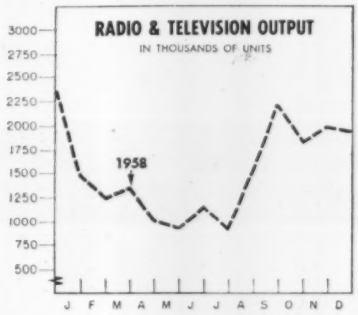
July production and new order figures are below the June level, say the majority of agents, due largely to the steel shutdown. Only 35 per cent of NAPA's respondents told of increased production compared with 46 per cent reporting increases in June and 60 per cent in May. Currently, 55 per cent say there is no change and 10 per cent report decreases.

While purchased material inventories are reported to have risen slightly in July, buyers are still reluctant to embark on any sizable inventory building program. Most still feel that, except for strike-created shortages, the items they buy



	Shipments—Units 1959	1958	1957
Jan.	266,200	235,400	214,900
Feb.	259,700	216,300	208,200
Mar.	265,900	221,600	226,600
Apr.	261,300	221,900	238,200
May	239,600	210,000	233,400
June	235,400*	231,000	211,700
July	.....	221,400	192,500
Aug.	.....	215,500	210,300
Sept.	.....	230,000	215,500
Oct.	.....	265,900	234,700
Nov.	.....	197,100	173,500
Dec.	.....	207,300	172,800
Totals	.....	2,673,400	2,532,300

*Preliminary.
Gas Appliance Mfrs. Assn.



	Radio 1959	1958	Television 1959	1958
Jan.	1,125	1,026	437	434
Feb.	1,125	877	459	370
Mar.	1,348	931	494	417
Apr.	1,040	630	389	303
May	1,040	655	432	267
June	1,430	774	571	337
July	....	622	...	275
Aug.	....	1,029	...	507
Sept.	....	1,572	...	622
Oct.	....	1,322	...	496
Nov.	....	1,546	...	438
Dec.	....	1,526	...	415
Totals	....	12,510	...	4,921

Electronic Industries Association.

will continue to be available in adequate quantities. While agents report shortages of some steel items, the consensus is that the real pinch will not be felt for another 60 days.

Shipments, Orders Rise

Manufacturers' shipments and new orders each increased about 2 per cent from May to June, reports the Department of Commerce. Backlogs of unfilled orders on manufacturers' books were reduced slightly in the period.

Sales of all manufacturers totaled $32 billion, $6 billion above June, 1958. June shipments were about 2 per cent above the May level in both durable and nondurable goods. Most major industries increased sales more than seasonally; primary metal and automotive producers recorded the largest advances, says Commerce.

Inventory book values rose by $500 million for the month; all of the accumulation took place in the durable goods industries, primarily in machinery and transportation equipment groups.

New orders were up 2 per cent in June over May for all producers; while durable goods makers scored a 4 per cent rise in the month. In spite of record delivery rates, month-end unfilled orders were $3.5 billion above a year ago.

Trends Fore and Aft

• Major steelmaking centers continue to report retail trade is holding up despite prolongation of the steel strike. In Youngstown, department store sales are up, theater attendance good, new car sales up sharply. In Pittsburgh, store sales were unchanged and new car registrations hit a new peak for the year.

• Estimated net income of Class I railroads in June totaled $73 million compared with $49 million in June, 1958. Net income for the first six months of 1959 was estimated at $308 million vs. $127 million in the 1958 period, says the Association of American Railroads. Total operating revenues in the first half were 10.8 per cent above the 1958 level.

• *Engineering News-Record's* construction cost index reached an all-time high for August. At the present rate of increase, heavy construction costs will double in less than 16 years; residential building costs will double in less than 20 years. Costs are now double what they were in 1947.

Luster-on

ECONOMICAL PROTECTIVE COATINGS FOR BRASS, ZINC, CADMIUM, COPPER, ALUMINUM

The Chemical Corporation offers a complete line of uniform-controlled chromate conversion coatings that provide maximum protection in one, low-cost, simple operation. Available for immediate delivery as liquid or powder.

Always Specify Luster-on —

FOR BRILLIANT CORROSION-RESISTANT FINISHES . . . rivaling chrome for many applications where cost is a factor. Long-lasting, easily controlled application.

FOR CLEAR, BRIGHT and IRIDESCENT COATINGS . . . gives striking, attractive appearance with complete corrosion-protection . . . even when humidity and handling are involved during processing. Also yellow iridescent and olive drab for concealed parts or as a paint bond.

FOR DECORATIVE COLOR . . . on low-cost zinc. Brilliant golds, yellows, blues, greens, violets, reds, brass and copper hues.

FOR ALUMINUM . . . where surface hardness is not of prime importance. Excellent finish for paint bonding.

FOR LASTING BRIGHTNESS . . . on both copper and brass without noxious fuming.

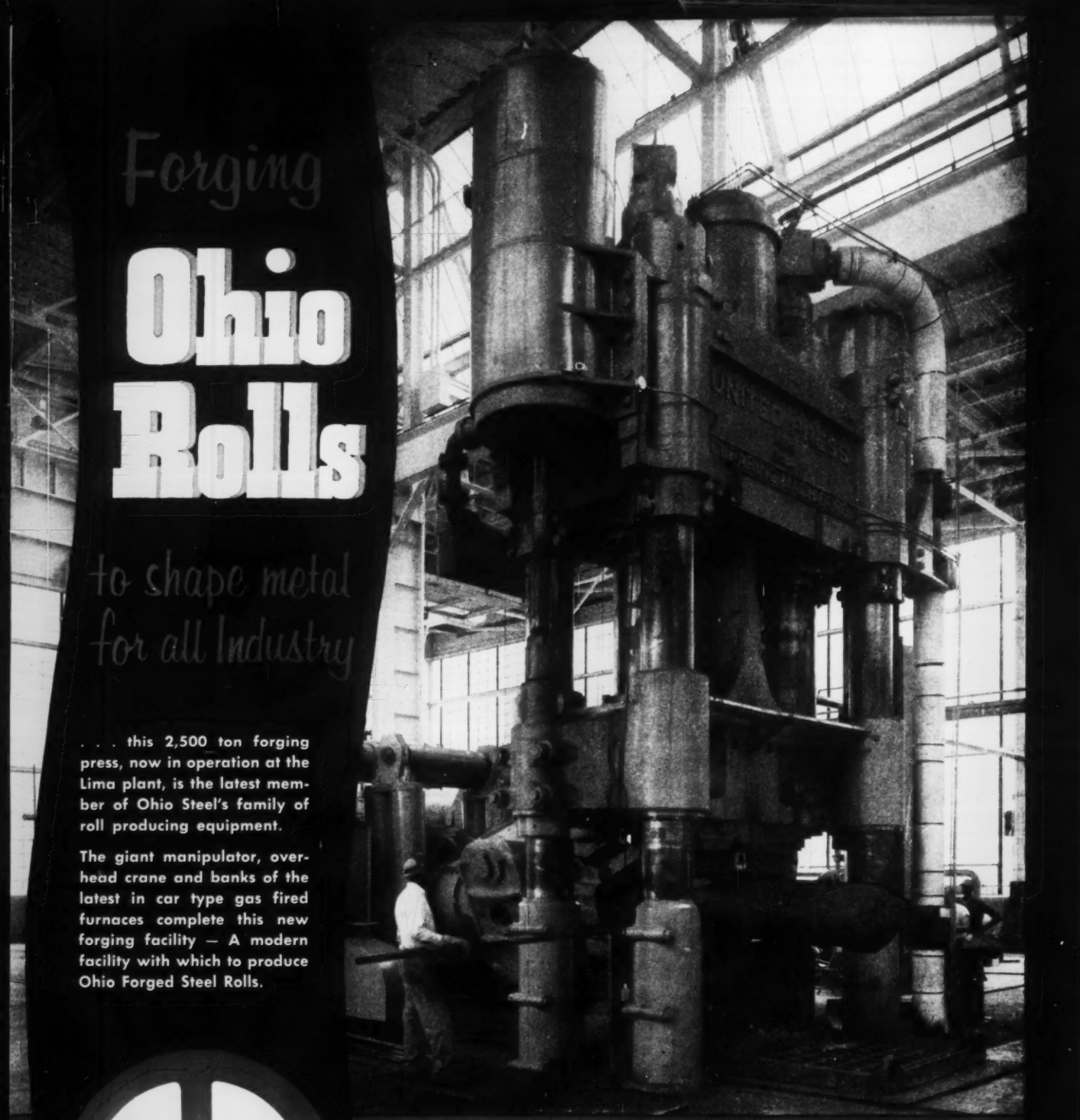
FOR DIE-CASTINGS . . . one quick dip provides uniform finish, ideal as a base for painting.

We'd like to show you what Luster-on can offer you! Send in sample part today for free processing. Data sheets on request.

Luster-on . . . the first and still the finest in conversion coatings.

The Chemical Corporation

72 Waltham Ave., Springfield 9, Mass.



Forging Ohio Rolls to shape metal for all Industry

. . . this 2,500 ton forging press, now in operation at the Lima plant, is the latest member of Ohio Steel's family of roll producing equipment.

The giant manipulator, overhead crane and banks of the latest in car type gas fired furnaces complete this new forging facility — A modern facility with which to produce Ohio Forged Steel Rolls.

The Ohio Steel Foundry Co.

LIMA, OHIO ... *Virtually at the center of the steel industry*

PLANTS AT LIMA AND SPRINGFIELD, OHIO

OHIO IRON AND STEEL ROLLS

Carbon Steel Rolls
Ohioloy Rolls
Ohioloy "K" Rolls
Nioloy Rolls
Flintuff Rolls
Double-Pour Rolls
Chilled Iron Rolls
Forged Steel Rolls
Denso Iron Rolls
Nickel Grain Rolls
Special Iron Rolls

IRVING S. BOULTON
Oliver purchasing dir.

RICHARD I. KERN
MPB v. p.-marketing

N. W. MORELLI
A-C Pittsburgh Works mgr.

PETER H. FRATANGELO
Mackintosh-Hemphill chief eng.

Irving S. Boulton was appointed director of purchases, **Oliver Corp.**, Chicago. He was assistant manager of the South Bend, Ind., plant.

Richard I. Kern was named vice president-marketing, **Miniature Precision Bearings Inc.**, Keene, N. H. He joined MPB in 1953 and served as western manager in Santa Barbara, Calif., until 1956 when he was named general marketing manager of the corporation.

Carl R. Rolf was named president of **Pioneer Engineering Div.**, Minneapolis, Poor & Co. Inc. He was executive vice president and succeeds **Oscar J. Ellertson** who resigned to devote full time to newly assigned duties as vice president of Poor & Co. in Chicago.

J. A. Rudy was made industrial sales manager of **Potter & Brumfield Div.**, Princeton, Ind., American Machine & Foundry Co.

Albert G. Handschumacher was elected president of **Lear Inc.**, Santa Monica, Calif., succeeding **James L. Anast**, resigned. Mr. Handschumacher served as a senior vice president of Lear until 1957 when he became a vice president of Rheem Mfg. Co.

R. M. Norris, recently elected vice president in charge of **Bucyrus-Erie Co.'s** newly formed International Div., Milwaukee, named **R. T. Craig** general sales manager, **J. A. Rossi** manager of sales-commercial cranes and excavators, and **W. F. Harcourt-Palmer** manager of sales-large machines.

N. W. Morelli was appointed works manager in Pittsburgh for **Allis-Chalmers Mfg. Co.** He succeeds **D. G. McArn** who is retiring. Mr. Morelli was superintendent of transformer assembly at the A-C Terre Haute, Ind., Works. **Hugh S. Sells** was made Boston district manager and **Albert R. Knauss** Knoxville, Tenn., district manager.

Frank T. Cameron was made manufacturing manager, **Ingersoll-Kalamazoo Div.**, Borg-Warner Corp., Kalamazoo, Mich. He was manager of Bucyrus-Erie Co.'s Evansville, Ind., plant.

Amperex Electronic Corp., Hicksville, N. Y., promoted **Irwin Rudich** to manager, special purpose tubes and semiconductors; and **John Messerschmitt** to manager, power tubes and renewal sales.

Wyckoff Steel Co. named **N. A. Robinson** and **W. A. Thompson** assistant vice presidents. They have headquarters at Putnam, Conn., and Newark, N. J., respectively.

Gilbert R. Boutin was appointed vice president-operations, **Chase Brass & Copper Co.**, Waterbury, Conn. **Walter L. Smith** has retired.

Ronald C. Currie was elected vice president and marketing manager of **Orr & Sembower Inc.**, Reading, Pa. He was manager of the midwest district.

Sam A. Meder was named sales manager of **Wheeling Steel Corp.'s** Pacific Coast territory. He is in San Francisco.

Peter H. Fratangelo was made chief engineer, **Mackintosh-Hemphill Div.**, Pittsburgh, E. W. Bliss Co. He was assistant chief engineer.

James H. Hinman was made manager of aluminum industrial sales for **Revere Copper & Brass Inc.**, New York, succeeding **John W. Eason**, recently made manager of Revere's Baltimore Div. Mr. Hinman was manager of aluminum sales for the Dallas Div. in Chicago.

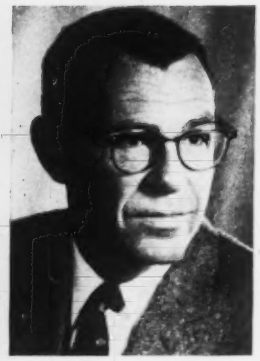
Robert M. Lamborn was made manufacturing manager, Cold Rolled Steel Products Div., **John A. Roebling's Sons Corp.**, Trenton, N. J., subsidiary of Colorado Fuel & Iron Corp. **R. Garrett Botsma** was named manager of Roebling's industrial engineering and planning.

Milton J. Kuhn was made western district manager, Los Angeles, for **Futurmill Inc.** He was with Davis Boring Tool Div., Giddings & Lewis Machine Tool Co.

John F. Adamson was named chief engineer, Wisconsin automotive operations, **American Motors Corp.**, Milwaukee. He succeeds **Floyd Kishline**, retiring.

David Scherer and **Edward F. Thaute** were made assistant managers, Scrap Purchasing Dept., **American Metal Climax Inc.**, New York. Mr. Scherer is in charge of dealer relations and will co-ordinate scrap buying throughout the country in addition to directing eastern scrap buyers' operations. Mr. Thaute is in charge of the

JAMES A. DRAIN
joins Porter Company



GORDON W. JOHNSON
Clow research director

WILLIAM F. GOTHER
Oilgear purchasing agent

ALEXANDER S. ZELLE
Bridgeport Rolling Mills eng.

Scrap Purchasing Administrative Section.

James A. Drain joined the executive staff of **H. K. Porter Company Inc.**, Pittsburgh, as a vice president. He was vice president and general manager, Mining & Construction Div., Joy Mfg. Co.

Gordon W. Johnson was named director of research, **James B. Clow & Sons Inc.**, Chicago. He is at the Coshocton, Ohio, plant, where research facilities are situated. Mr. Johnson was assistant director of Malleable Research & Development Foundation, Granville, Ohio.

Robert F. Carleton joined **Servo Corp. of America**, New Hyde Park, N. Y., as sales manager, Instruments & Product Sales Div. He was with Norden - Ketay Corp.'s Precision Components Div. and most recently was vice president of Connecticut Electronic Corp.

H. B. Hebble, who has been working on development of vacuum induction melting of uranium at National Lead Co. of Ohio in Cincinnati, joined the Vacuum Metallurgical Dept., **F. J. Stokes Corp.**, Philadelphia, as product specialist on vacuum induction melting equipment.

W. C. Schnackel, assistant manager of sales of **Republic Steel Corp.**'s Bar Div., Cleveland, was made assistant district sales manager in Detroit. He is succeeded by **W. L. Myers.**

Lee B. Musser was made Atlantic regional manager for the Industrial Controls Section, **Bendix Aviation Corp.** He is in Hartford, Conn.

William F. Gother was appointed purchasing agent, **Oilgear Co.**, Milwaukee, to succeed **Harold J. Jungbluth**, resigned. For the last four years, he directed the purchase of Oilgear patterns and castings. **Norman C. Harenburg** succeeds Mr. Gother and was named assistant purchasing agent.

Robert W. Schoeffler was made field sales manager, **Marshall & Huschart Machinery Co.**, Chicago.

At the Worcester, Mass., district of U. S. Steel Corp.'s **American Steel & Wire Div., Dana B. Carleton** was named works superintendent, New Haven, Conn., Works succeeding **John J. Grimes Jr.**, recently made general superintendent for New Haven and Trenton, N. J., Works. Named to succeed Mr. Carleton as works superintendent, Trenton Works, is **Albert K. Zeitell. James H. Merrill** fills Mr. Zeitell's former post as division superintendent, wire mill, for Worcester's South Works.

Alexander S. Zelle was appointed chief engineer of **Bridgeport Rolling Mills Co.**, Bridgeport, Conn., a subsidiary of Atlantic Coast Industries Inc. He was director of engineering at W. S. Rockwell Co. and works engineer of Stamford Rolling Mills Co.

Marcus G. O'Neill was made manager of quality control; **Gerald L. Brock** chief industrial engineer of the electrical products group, Syracuse, N. Y., **Electric Auto-Lite Co.**

B. G. Tubbs was named president of **Vard Inc.**, Pasadena, Calif., subsidiary of Royal Industries Inc. He was executive vice president and general manager of Royal Jet Inc., another Royal subsidiary in Alhambra, Calif.

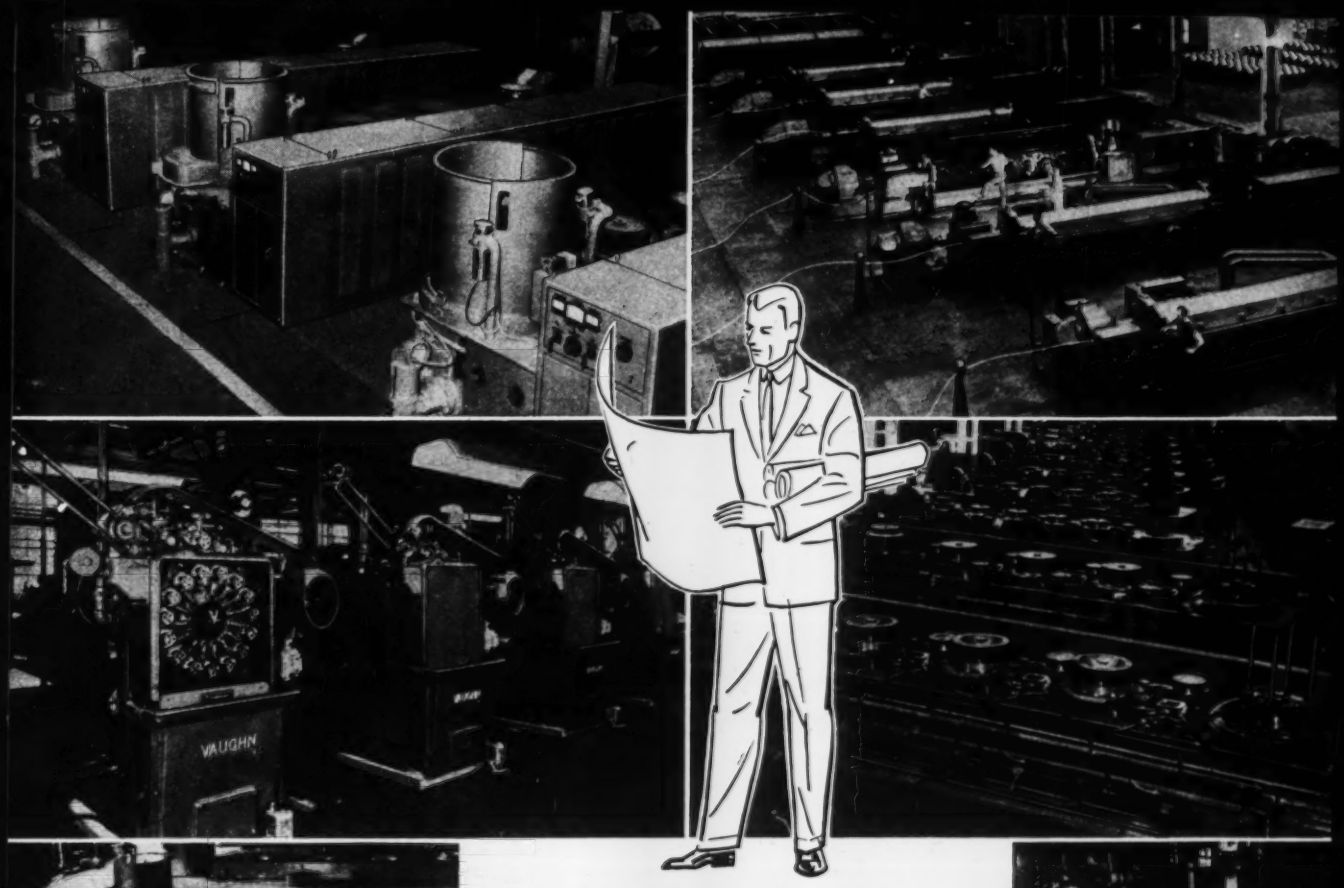
William E. A. Best was appointed assistant vice president-sales, **National Steel Corp.**, in charge of west coast district sales office operations. He was assistant vice president-

DANA B. CARLETON

ALBERT K. ZEITELL

JAMES H. MERRILL

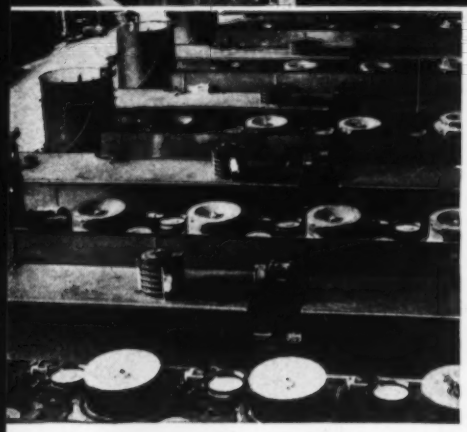
AS&W management posts-Worcester Dist.



TO WIRE MILL MANAGEMENT:

If you're planning expansion tomorrow

-call Vaughn® in today!



'Quick on the Draw!'

V®

MOTOBLOCS®
MOTOBLOX®
RINGBLOX®
TUBEBLOCS®
DRAWBENCHES
TAKE-UP FRAMES
SCALPERS
SPOOLERS
STRAIGHTENING AND CUTTING MACHINES
DIE STRINGERS
POINTERS
STATIONARY BLOCKS
AUXILIARY EQUIPMENT

Vaughn engineering is at your service in many helpful ways—from consultations on your preliminary planning to the final layout of wire room equipment . . . for the most effective utilization of today's high speed wire drawing equipment. As a beginning, why not have a Vaughn engineer sit down with you and check over the many advances in design and operation achieved by Vaughn equipment in just the last three years? No obligation whatever—and you'll gain by it!

THE VAUGHN MACHINERY COMPANY

Cuyahoga Falls, Ohio, U.S.A.

COMPLETE COLD DRAWING EQUIPMENT . . . Continuous or Single Hole . . . for the Largest Bars and Tubes . . . for the Smallest Wire . . . Ferrous, Non-Ferrous Materials or their Alloys.

ROBERT W. EBEY
Hoover Ball Div. gen. mgr.

H. W. GAECKLE
Dracco Div. v. p.

RALPH SCHWARZ
Florida Production Eng. pres.

MAURICE E. HOLLADAY
Chiksan-Hamer Valves exec.

DAVID C. McNEELY
Helipot Div. manager

FRANK K. TANNER
Alliance Machine gen. supt.

sales on the West Coast for Weirton Steel Co., a division.

Maurice E. Holladay was appointed a vice president of **Chiksan Co.**, Brea, Calif., and general manager of its newly acquired **Hamer Valves Div.** He was vice president and co-manager, with L. S. Hamer, of Hamer Valves Inc., Long Beach, Calif. Chiksan is a subsidiary of Food Machinery & Chemical Corp.

David C. McNeely was made manager of the **Helipot Div.** of Beckman Instruments Inc., Fullerton, Calif. He has served as acting manager since April, 1958.

John M. Wordingham was elected president of **Phoenix Products Co. Inc.**, Milwaukee, to succeed his father, the late **Maurice G. Wordingham.**

J. H. Burling, former assistant comptroller of **Fuller Mfg. Co.**, Kalamazoo, Mich., subsidiary of Eaton Mfg. Co., was elected secretary-treasurer. He also was elected secretary of Shuler Axle Co., Louisville, a Fuller subsidiary.

Frank K. Tanner was appointed general superintendent, **Alliance Machine Co.**, Alliance, Ohio. Associated with the company for 30 years, he formerly served as director of quality control.

Lowell C. Powell was made product manager, heat treating equipment, **Salem-Brosius Inc.**, Pittsburgh. He has been with S-B since it acquired the George J. Hagan Co. in 1954. Prior to that time, he was district sales manager for Hagan at Ft. Wayne, Ind.

S. B. Smart Jr., former Milwaukee district sales manager, was made general manager of the mideastern district of **Continental Can Co.** He has offices in Baltimore. **David Wilson** fills the Milwaukee post.

E. S. Mathiesen, former works manager, was elected vice president-manufacturing at **Cutler-Hammer Inc.**, Milwaukee. He succeeds **W. F. Lent** who continues as a vice president with broad company assignments.

Robert W. Ebey was made general manager of a new Ball Div., **Hoover Ball & Bearing Co.**, Ann Arbor, Mich. **Robert C. Ressler**, vice president-general manager of the former Ball & Bearing Div., continues as general manager, Hoover Bearing Div. Also named to administrative posts in the new division are: **James Veras**, plant manager; **Phyl Stimpson**, controller; **Carl Conlon**, plant superintendent. Mr. Veras, who was director of materials for the combined division, continues in that capacity for the Ball Div.

H. W. Gaeckle was named vice president and general manager of **Dracco Div.**, Fuller Co., Cleveland. He has been with Dracco 22 years and has served as general sales manager since 1950.

Ralph Schwarz, former president of Michigan Production Engineering Co., Detroit, which he organized 14 years ago, has formed **Florida Production Engineering Co.** at Daytona Beach, Fla. Mr. Schwarz, FPE president, continues to specialize in design and building of tools, dies, and special automated machinery.

OBITUARIES...

Frank R. Kohnstamm, president, **Jack & Heintz Inc.**, Cleveland, died Aug. 7.

William H. Gallmeyer, 76, president and treasurer, **Gallmeyer & Livingston Co.**, Grand Rapids, Mich., died July 25.

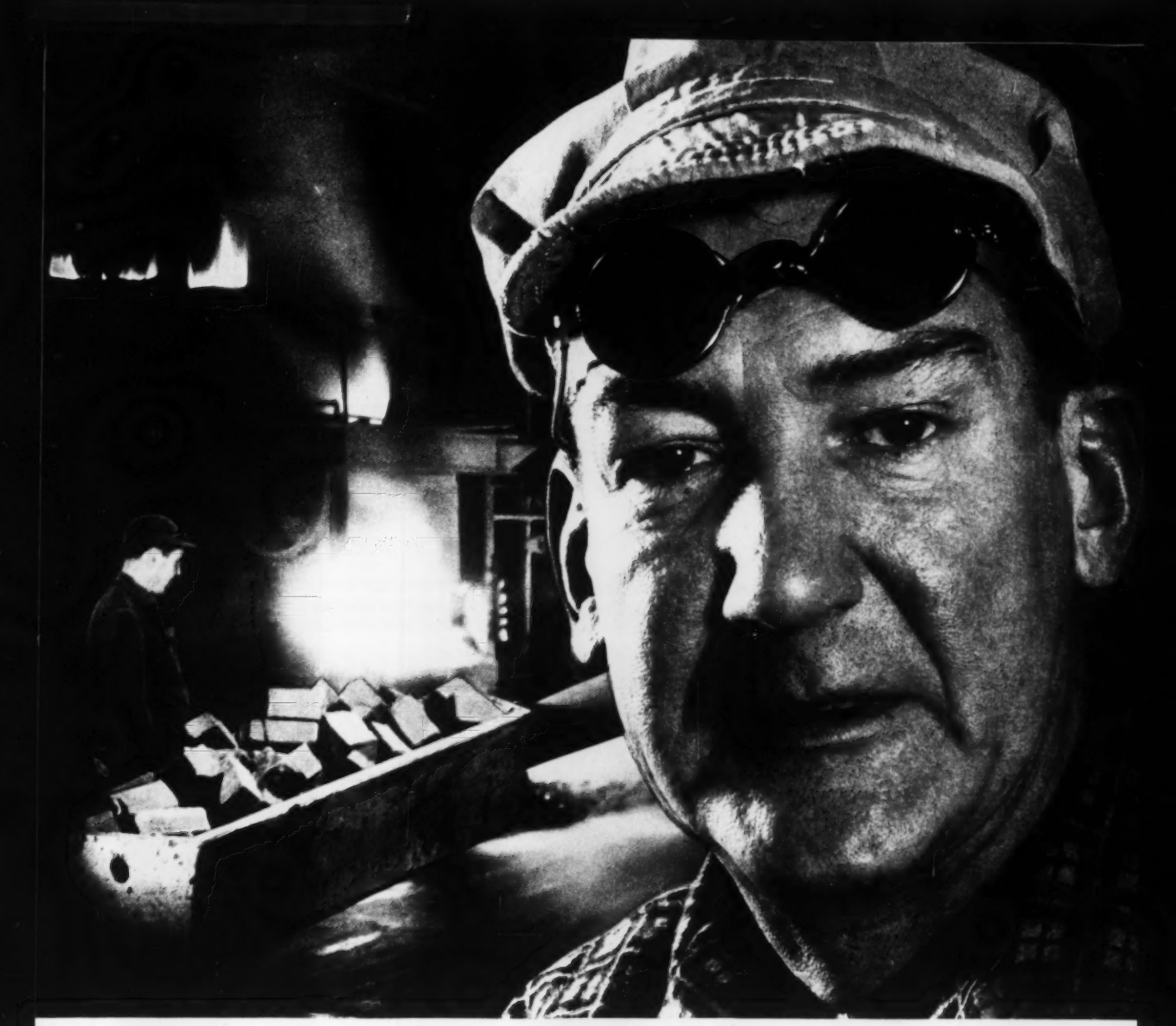
Albert P. Spooner, retired metallurgical engineer, Steel Div., **Bethlehem Steel Co.**, Bethlehem, Pa., died Aug. 2.

Frank Skobis Jr., 74, retired president and treasurer, **Skobis Co.**, Milwaukee, died July 31.

Fred G. Sutphen, 80, retired research consultant with **Armco Steel Corp.**, Middletown, Ohio, died Aug. 2.

William W. Gamwell, 61, assistant treasurer, **New Jersey Zinc Co.**, New York, died Aug. 4.

Alfred Kauffmann, 70, former president, **Link-Belt Co.**, Chicago, died Aug. 7.



"This new SIMPLEX ferrochrome melts like butter"

The fastest dissolving low-carbon ferrochrome for stainless steel is new SIMPLEX ferrochrome. Ideal for use during slag reduction or finishing, the alloy penetrates the slag easily and provides rapid cooling of the bath. Its carbon level is so low—0.010 or 0.025 percent maximum carbon—that additions generally lower the bath carbon content. And it is one of the lowest priced low-carbon ferrochromes available.

Ask your UNION CARBIDE METALS representative for additional information about this unique new alloy.

UNION CARBIDE METALS COMPANY, Division of Union Carbide Corporation, 30 East 42nd Street, New York 17, N. Y.
In Canada: Union Carbide Canada Limited, Toronto.

For more facts on rapid solubility, write for this new six-page SIMPLEX ferrochrome folder.

UNION CARBIDE METALS

Electromet *Brand Ferroalloys and other Metallurgical Products*

The terms "Electromet," "Simplex," and "Union Carbide" are registered trade marks of Union Carbide Corporation.

Handle Any Adjustable-Speed Job with One of these Square D "packages"*

One of 13 CUSTOM DRIVES for an automotive plant for control of 6 miles of monorail conveyors

** a Square D "package" includes the power conversion unit, operator's station, and drive motor*

ELECTRONIC DRIVES

employ advanced designs using more static elements and less tubes. Fail-safe circuits prevent motor runaways. Available in sizes from 1/20 H.P. through 40 H.P.

STATIC POWER MAGNETIC AMPLIFIER DRIVES

provide top reliability and simple maintenance. Save both floor space and weight as compared to conventional drives. Available in sizes through 400 H.P.

MOTOR-GENERATOR DRIVES

use static regulators and rectifiers for simplified maintenance. Rugged, heavy-duty components are provided in each drive. Available in sizes through 400 H.P.

CUSTOM DRIVES

for every possible adjustable-speed requirement can be designed for you using combinations of the above units, plus special units, with accuracies to fractions of 1%. The answer to your adjustable speed problem is as near as your Square D field office.

No matter what adjustable-speed requirements you may have, you can select a Square D drive to meet them exactly. Moreover, every component—from control to drive motor—is subjected to a complete electrical test, and the entire drive is test-run at the factory to assure top performance on the job.

***Write** for complete details. Ask for Adjustable-Speed Bulletin. Square D Company, 4041 North Richards St., Milwaukee 12, Wis.*

EC&M HEAVY INDUSTRY ELECTRICAL EQUIPMENT...NOW A PART OF THE SQUARE D LINE

SQUARE D COMPANY

Metalworkers to Expand on Canadian Shore of Seaway

A MULTIMILLION dollar steelmaking and fabricating complex along the St. Lawrence River some 20 miles northeast of Montreal, Que., is developing. Plans have been given a strong impetus by costly delays in shipping through the Welland Canal.

The area is along the south shore of the river and encompasses Varennes, Vercheres, and Contrecoeur, Que. The St. Lawrence River there offers a natural 35 ft deep channel close to the shore compared with the 27 ft channel through the artificially made part of the Seaway.

A Seaway official, commenting on the effects of Welland Canal shipping tieups, said that processing ore into steel in the area instead of moving it up the St. Lawrence to interior steel mills is "logical."

Iron ore is being brought upstream from Ungava and Northern Quebec, then transferred to Great Lakes ore carriers moving through the Seaway to Buffalo and other Great Lakes ports to feed midcontinent steel mills.

• **Would Cut Costs**—Establishment of a basic steel complex in Contrecoeur and nearby communities, Canadians believe, would reduce the cost of steel by saving shipping time and Seaway tolls.

Rail facilities are provided by a main line of the Canadian National Railways. Water and electricity are provided by the Shawingan Water & Power Co. The Quebec Natural Gas Corp. plans to build a $5 million pipeline to the Contrecoeur area.

Steel Co. of Canada Ltd., has a $10 million pipe mill under construction at Contrecoeur. The Iron Ore Co. of Canada owns a $4.5 million shipping facility in the area. Dominion Steel & Coal Corp. has bought a large tract of land on which it plans to build a hot and cold rolling mill. Other industries in steelmaking, fabricating, and allied fields contemplate building plants in the area.

Stelco Sets Records

Steel Co. of Canada Ltd., Hamilton, Ont., established three records in the first six months of the year: More steel produced and rolled, bigger shipments to customers, and higher employment. H. C. Hilton, president, says Stelco's plants have been operating at a rate close to capacity.

While prices of the firm's major products lines haven't changed in more than two years, there have been persistent pressures tending to drive prices up, Mr. Hilton says. These include a 7 cent hourly rate rise throughout the company, an advance of $2 a day since January in coal miners' wages, tolls on the Welland Canal, and higher income taxes and unemployment insurance rates.

It is still too soon to tell what effect the steel strike in the U. S. will have on Stelco's supplies of iron ore from strikebound mines in Michigan and Minnesota, he says.

Fageol Buys Larger Plant

R. D. Fageol Co., Kent, Ohio, purchased a 100,000 sq ft plant in that city. The firm makes flasher safety lights, degassers, and ignition boosters.

Plans Move to Bermuda

Reynolds International Inc., overseas manufacturing and sales arm of Reynolds Metals Co., Richmond, Va., is establishing its administrative headquarters in Hamilton, Bermuda. Reynolds International holds interests in aluminum plants in Canada, Mexico, Cuba, Columbia, the Philippines, Germany, Denmark, and Ireland. Reynolds recently acquired an interest in British Aluminium Co. Ltd., which in turn has interests in bauxite mines in France and Ghana and operates fabricating plants in the United Kingdom and Canada. The firm also holds substantial interests in two Norwegian reduction plants and in fabricating plants in Australia and India.

Plans Metal Powder Plant

Patented copper-lead bearing powders will be produced by a water-jet atomizing process in a plant being built at St. Johns, Mich., by Federal-Mogul-Bower Bearings Inc., Detroit. The plant, an addition to the St. Johns manufacturing facilities, will double production capacity, says R. W. Muzzy, Federal-Mogul Div. manager.

Power Project Progresses

Commonwealth Edison Co., Chicago, will complete construction of its Dresden nuclear power station near Morris, Ill., by Oct. 1. It will begin producing power early next year and will be in full operation by mid-1960. Built by General Electric Co., Schenectady, N. Y., it is of the boiling water type with capacity of 180,000 kw.

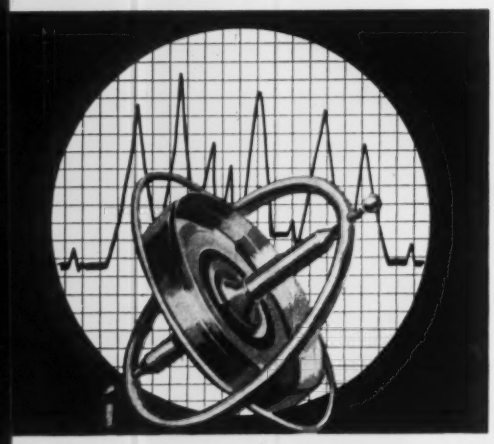
Fluorocarbon Dissolved

Fluorocarbon Products Inc., a division of United States Gasket Co., has been designated a production department of the parent Garlock Packing Co., Palmyra, N. Y. An Electronic Products Dept. has been established to integrate its broad proprietary line of packings, gaskets, and seals with the Fluorocarbon Products line.

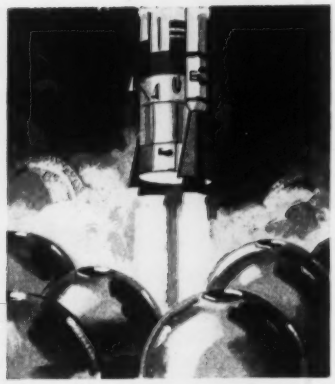
Forms Canadian Subsidiary

Ajax Magnethermic Corp., Youngstown, organized Ajax Magnethermic Canada Ltd., Ajax, Ont., to market in Canada products of the parent company. They include low frequency melting furnaces manufactured by the Ajax Engineering Div., high frequency melting furnaces made by Ajax Electrothermic Div., and billet heaters and heat treating equipment manufactured by the Magnethermic Div. Officers of the Canadian subsidiary are: Chairman, J. A. Logan; president, Ivor Slater; vice president, B. E. McArthur. Plans are under-

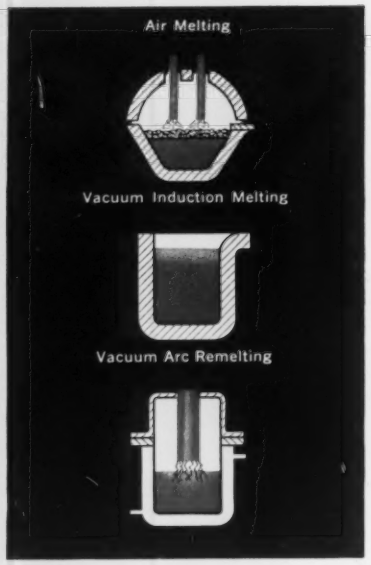
(*Please turn to Page* 78)



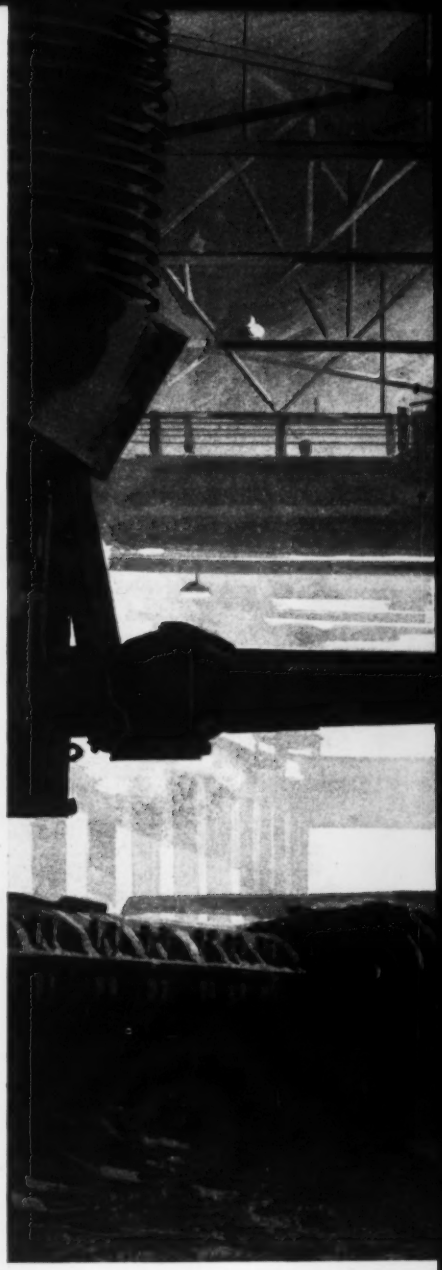
b



c



d



a. Titanium slabs are heated prior to rolling into continuous sheet coils. Crucible's increased capacity for producing high purity metals, in all sizes and mill forms, is substantially reducing costs and delivery times.

b. ***Vacuum Melted Alloys*** *are specified for gyroscope balls used in navigational and fire direction systems. The metals' improved properties facilitate miniaturization.*

c. ***Titanium*** *helium storage bottles for ICBM Atlas. Titanium, which must be vacuum melted, was selected because of its high strength weight ratio, cold-resistant properties and corrosion resistance.*

d. ***Basic Melting Processes.*** *Vacuum induction melting produces "purer" metals than conventional air melting because it eliminates all sources of contamination except the crucible. Vacuum arc remelting eliminates the crucible and permits production of ingots up to 18,000 lbs.*

VACUUM MELTING CREATES

Marked improvements in properties produced by High-Purity Metallurgy

Behind the development of space-age metals with entirely new characteristics is vacuum melting — a series of processes that produce "purer" metals with better properties.

Why Vacuum Melt? Vacuum melting protects molten metal from contact with air. It also provides closer control of composition, helps eliminate inclusions, and minimizes center porosity and segregation in ingots.

In the field of vacuum melting, Crucible's position is unique. As the leading producer of special purpose steels, Crucible's experience in high-quality steelmaking is unsurpassed. Through formerly affiliated companies, now fully integrated with it, Crucible led in the development and commercial production of vacuum-melted steels, iron, nickel, copper — and titanium. Therefore, Crucible's breadth of experience, together with its extensive facilities, places the company in the best position to provide the "super-quality" metals most suitable for any given application.

The three vacuum-melting processes — One of the Crucible processes is VIM — *vacuum induction melting*. It starts with very high-purity raw materials, produces extremely pure ingots. A second is VAR — *vacuum arc remelting*, or the consumable electrode process. This process, starting with air-melted electrodes, produces large ingots — up to 32″ diameter x 18,000 lbs. It provides

a

SUPER-DUTY METALS

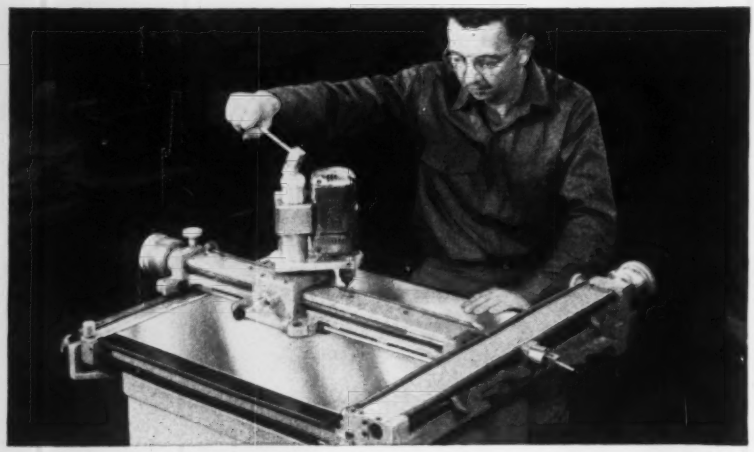
metal with low-gas content and greatly improved uniformity of properties. The third process is VIR — *vacuum arc remelting of vacuum induction melted electrodes*—a double-melting technique. It permits manufacture of super-pure metals in the full range of ingot sizes.

Crucible's experience with all three processes, and its facilities for vacuum arc remelting its own specially air- or vacuum-melted electrodes, provides industry with a complete range of vacuum-melted metals at the lowest possible cost. Only at Crucible is there available this experience, flexibility and the facilities for vacuum-melting titanium, super-alloys, heat-resisting alloys, bearing steels, tool steels, stainless steels, electronic alloys and nuclear reactor materials.

If you'd like to know more about Crucible's work in High-Purity Metallurgy, read: "Quality Aspects and Properties of Vacuum Induction Melted and Vacuum Arc Remelted Steels and Super Alloys" and "Titanium for Aircraft and Spacecraft". Write: *Crucible Steel Company of America, Dept. AH-15, The Oliver Building, Mellon Square, Pittsburgh 22, Pa.*

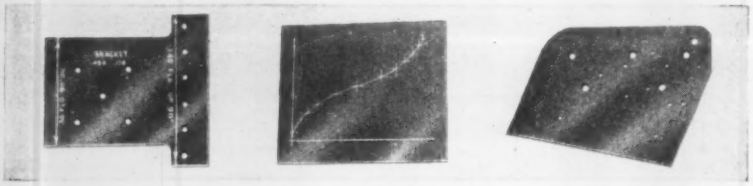
CRUCIBLE STEEL COMPANY OF AMERICA

layout and template making time cut in half . . .



THE NEW STRIPPIT FLEX-O-DRILL

- **DRILLS, REAMS, SCRIBES, CENTER PUNCHES** to ± 0.002" WITHOUT base line drawing or height gauge layout!
- **EASY, ACCURATE POSITIONING**—quickly set to any reference point and to nearest 0.100" by adjustable steel tapes reading in both directions from zero. Micrometric gauges then bring settings to nearest 0.001". No optical scanning device needed.
- **LASTING ACCURACY!** Table is an actual ground surface plate. Bridge assembly is of heavy, accurately machined castings. Lead screws are precision ground and engaged only during micrometric gauge settings to minimize wear. All parts are corrosion-resistant. Bearings are protected against dust and chips by felt shields. Drill motor is heavy-duty industrial type.
- **¼" CAPACITY** in mild steel — stock up to 24" width, any length.
- **ALSO A PROVEN MONEY-SAVER** on pilot runs, low unit production.



Template drilled by Flex-O-Drill | *Layout scribed by Flex-O-Drill* | *Flex-O-Drill work piece*

WRITE FOR LITERATURE TODAY, and an actual demonstration at your plant:

WALES STRIPPIT INC.
210 Buell Road, Akron, New York

UNIT OF HOUDAILLE INDUSTRIES INC.

In Canada: Strippit Tool & Machine Company, Brampton, Ontario

(*Concluded from Page 75*)

way to manufacture billet heaters, melting equipment, and heat treating units in Canada.

Widens Foundry Research

Magnet Cove Barium Corp., Houston, is completing construction of a new sales office and foundry research building at Rolling Meadows, Ill. Magcobar, one of the Dresser Industries, produces bentonites for the foundry industry. The building will be headquarters for the firm's Foundry Div., now at Des Plaines, Ill.

Offers Nickel Chemicals

Vitro Rare Metals Co., Canonsburg, Pa., a division of Vitro Corp. of America, New York, has started production of nickel sulfate, nickel chloride, and nickel carbonate for electroplating operations. The Canonsburg plant also is producing nickel acetate and formate. These products are distributed by Berkshire Chemicals Inc., a Vitro subsidiary.

Boosts Forging Capacity

Ladish Co., Cudahy, Wis., is operating a die forging hammer which can deliver a force of more than 100,000 tons at the moment of impact. It can make closed impression die forgings weighing more than 22,000 lb. The firm is also operating a ring rolling machine which turns out seamless rolled rings up to 24 ft in diameter. Applications include missile cylinders, jet engine components, generators, ship gears, and radar trackers.

Camrose to Get Pipe Mill

Camrose Tubes Ltd. will be incorporated to operate the $10 million steel pipe mill to be built at Camrose, Alta. The site of the joint project of Page-Hersey Tubes Ltd., Toronto, Ont., and Steel Co. of Canada Ltd., Hamilton, Ont., had been announced originally (STEEL, May 18, p. 87) as Edmonton, Alta. Contract for design and construction of the mill building has been let to Canadian Bechtel Ltd. Delivery of the pipemaking machinery is expected to start in November or December. Produc-

Hydraulic Cylinder Manufacturer Specifies

Loading a minimum quantity of Ostuco tubing at the Shelby mill — in this instance only 150 feet.

"When you make hydraulic cylinders in 11 bore sizes . . . dozens of different pressure ratings . . . a variety of wall thicknesses and analyses — you've got a man-size tubing inventory problem.

"That's why we switched to Ostuco tubing made to our *exact specifications*. We like its availability in truly *small minimum quantities*. And with its consistently close tolerances, shipment after shipment, Ostuco tubing has *cut our machining time over 50 percent* . . . "

This is an actual case history of a manufacturer with a severe inventory problem. He required special tubing grades in minimum quantities. If you're faced with a similar situation, it's time you contacted your Ohio Seamless representative, listed in the Yellow Pages, or the mill at *Shelby, Ohio — Birthplace of the Seamless Steel Tube Industry in America.*

AA-8843

OSTUCO SHELBY, OHIO — OSTUCO TUBING

OHIO SEAMLESS TUBE DIVISION

of Copperweld Steel Company · SHELBY, OHIO

Seamless and Electric Resistance Welded Steel Tubing • Fabricating and Forging

SALES OFFICES: Birmingham, Charlotte, Chicago (Oak Park), Cleveland, Dayton, Denver, Detroit (Huntington Woods), Houston, Los Angeles (Lynwood), Miami, Moline, New Orleans (Chalmette), New York, North Kansas City, Philadelphia (Wynnewood), Pittsburgh, Rochester, St. Louis, St. Paul, Salt Lake City, Seattle, Tulsa, Wichita **CANADA:** Railway & Power Engr. Corp., Ltd. **EXPORT:** Copperweld Steel International Company, 225 Broadway, New York 7, New York

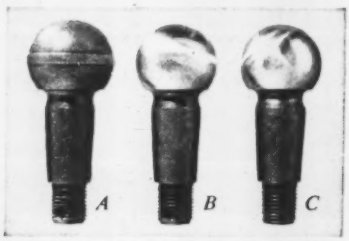
WHY PROCESSING TRUNCATED SPHERES BY MICROMATIC METHOD IS FASTER, ECONOMICAL AND MORE ACCURATE

Machining of accurate truncated spheres has long been a design and production problem. The root of the problem lies in the fact that as a single point tool generates a spherical surface, the surface speed varies widely. To eliminate this problem, Micromatic has developed a fast, two-operation technique that assures uniform surface speed when machining any type of truncated sphere.

The above ball studs and other truncated spheres are typical of parts that can be processed faster, to closer tolerances and at lower cost with Micromatic machines and tooling.

First, a special cutting tool removes the bulk of excess stock from the forged part. For instance, here are the results obtained by a major automotive manufacturer: on a 1¼" diameter ball stud, approximately .060" of stock is removed from the ball in a 15-second floor-to-floor cycle. A finish of 40-60 microinches rms is obtained, total error in sphericity is held to .0005" and size is controlled within .001".

Microhoning is the second operation. In a 24-second floor-to-floor cycle, it removes final .002" of stock from the ball to generate required size, a finish of 6-10 microinches rms, sphericity within .0003" and a functional cross-hatch lay pattern.



Typical ball stud processing—(A) heat-treated forging, (B) after Micromatic cutting tool operation, (C) finished ball stud after Microhoning.

See facing page for further details on how Micromatic processing of truncated spherical surfaces secures the above results.

MICROMATIC HONE CORP.
8100 SCHOOLCRAFT AVENUE • DETROIT 38, MICHIGAN

tion will include pipe ranging up to and including 42 in. in diameter in continuous 40 ft lengths.

GM to Enlarge Plants

Chevrolet Motor Div., General Motors Corp., Detroit, plans to nearly double the size of the Chevrolet and Fisher Body assembly plants at Baltimore. The combined facilities will be increased from around 1,044,000 sq ft to 2,064,000 sq ft.

Detroit Harvester Renamed

Detroit Harvester Co., Oak Park, Mich., changed its named to Dura Corp. (see Page 99). It has expanded into widely diversified fields and its products now include auto parts, automotive service equipment, diecastings, permanent mold aluminum castings, power take-offs, industrial pumps, street sweepers, power lawn mowers, contour beds, and farm machinery.

Dow Forms New Division

Dow Chemical Co., Midland, Mich., organized a new division, Dow Metal Products Co., for the fabrication and semifabrication of magnesium, aluminum, and other metals. Officers of the new division, which replaces the Dow Magnesium Products Dept., are: President, Hubert Fruehauf; vice president, Dr. J. D. Hanawalt; vice president and chief financial officer, H. H. Lyon; vice president and sales manager, D. H. Gilmore; and secretary and assistant to the president, A. W. Winston Sr.

Damascus Tube Expands

Damascus Tube Co.'s $400,000 expansion and facility improvement program at its plant in Greenville, Pa., will increase its production capacity by one-third. An 18,200 sq ft addition has been completed, new equipment has been installed, and operating departments are being relocated and streamlined. New equipment scheduled for installation in October will enable the company to produce tubing up to 75 ft in length and will open new markets for a new line of special precision tubular products, says Ray L. Kelley, plant manager. Additional

laboratory equipment to be installed will be under the supervision of B. B. Burd, chief metallurgist. New facilities and machinery better equip Damascus to produce tubing from rare and reactive metals, says F. A. Guba, manager of marketing.

Forms R&D Subsidiary

Scully-Jones & Co., Chicago, formed Scully-Anthony Corp., a research and development subsidiary with headquarters at 4707 Willow Springs Rd., La Grange, Ill. Officers of the new company are: Chairman, H. Dale Long; president, Myron Anthony; vice president, J. D. Lockrem; treasurer, L. H. Skoglund Jr.; and secretary, Joan Scully.

Wiremaker to Expand

Maryland Fine & Specialty Wire Co. Inc., Cockeysville, Md., plans to erect a 7200 sq ft plant addition and a 3000 sq ft office facility. The present office area of about 5000 sq ft will be converted for manufacturing purposes. Construction is scheduled to begin this month.

CONSOLIDATIONS

Koehring Co., Milwaukee, acquired **Shawnee Mfg. Co. Inc.**, Topeka, Kans., heavy equipment manufacturer, and will operate the property as part of its Parsons Div., Newton, Iowa.

Advance Aluminum Castings Corp., Chicago, purchased **Ross Mfg. Co.**, that city. The merged company will be called Advance Ross Electronics Corp. with A. S. Bowes, chairman, and H. C. Buckingham, president.

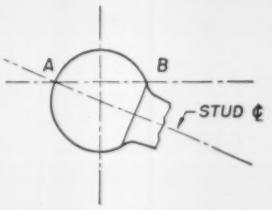
Hevi-Dtuy Electric Co., a division of Basic Products Corp., Milwaukee, purchased **Sermax Corp.**, that city, manufacturer of ovens and special equipment. Roland Goetsch is head of the Industrial Oven Div., while Ernst Krubsack is manager of Hevi-Duty's oven plant.

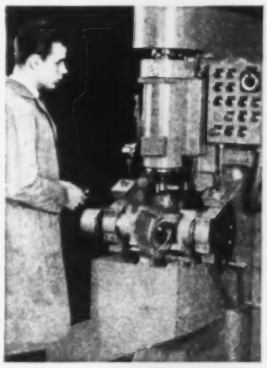
Porter Athletic Equipment Co., a division of Waco Mfg. Co., Minneapolis, acquired **Kodakon Tool & Engineering Co.**, Schiller Park, Ill.

(*Please turn to Page* 84)

HOW PROCESSING **TRUNCATED SPHERES BY MICROMATIC METHOD ASSURES ECONOMY, SPEED AND ACCURACY**

As an example, here's how Micromatic equipment in two fast operations machines 1¼" diameter forged ball studs. For both operations, the ball stud is located on the taper, clamped in the thread and positioned on an inclined axis. Thus the center of the ball crown (A) and the intersecting point of sphere and shoulder (B) are in a horizontal plane.

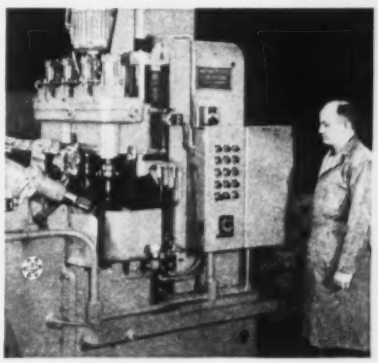




FIRST OPERATION: *Cutting excess stock from forged ball stud.*

The first machining of ball stud is a cutting operation. A special Micromatic cutting tool, that is U-shaped at the cutting end, is used to assure constant cutting speed over every point of the ball. Two round carboloy blades are clamped in the tool—clamp also acts as a chip breaker. With blades positioned in a counterbore, no adjustments are required. Size is controlled within .001" by depth of feed, set by an adjustable stop. Blades may be turned or reversed to give several usable cutting faces. Also, since they are throw-aways, these blades offer additional economies. Approximately 2,000 balls are machined with each set of blades. In a 15-second floor-to-floor cycle, the cutting operation is completed—total error in sphericity is held to .0005".

The ball is then Microhoned. The combination or rotating motions of workpiece and the special Microhoning tool results in a functional cross-hatch lay pattern and makes the abrasive self-dressing. In a 24-second floor-to-floor cycle, Microhoning generates required size, sphericity within .0003" and a finish of 6-10 microinches rms.



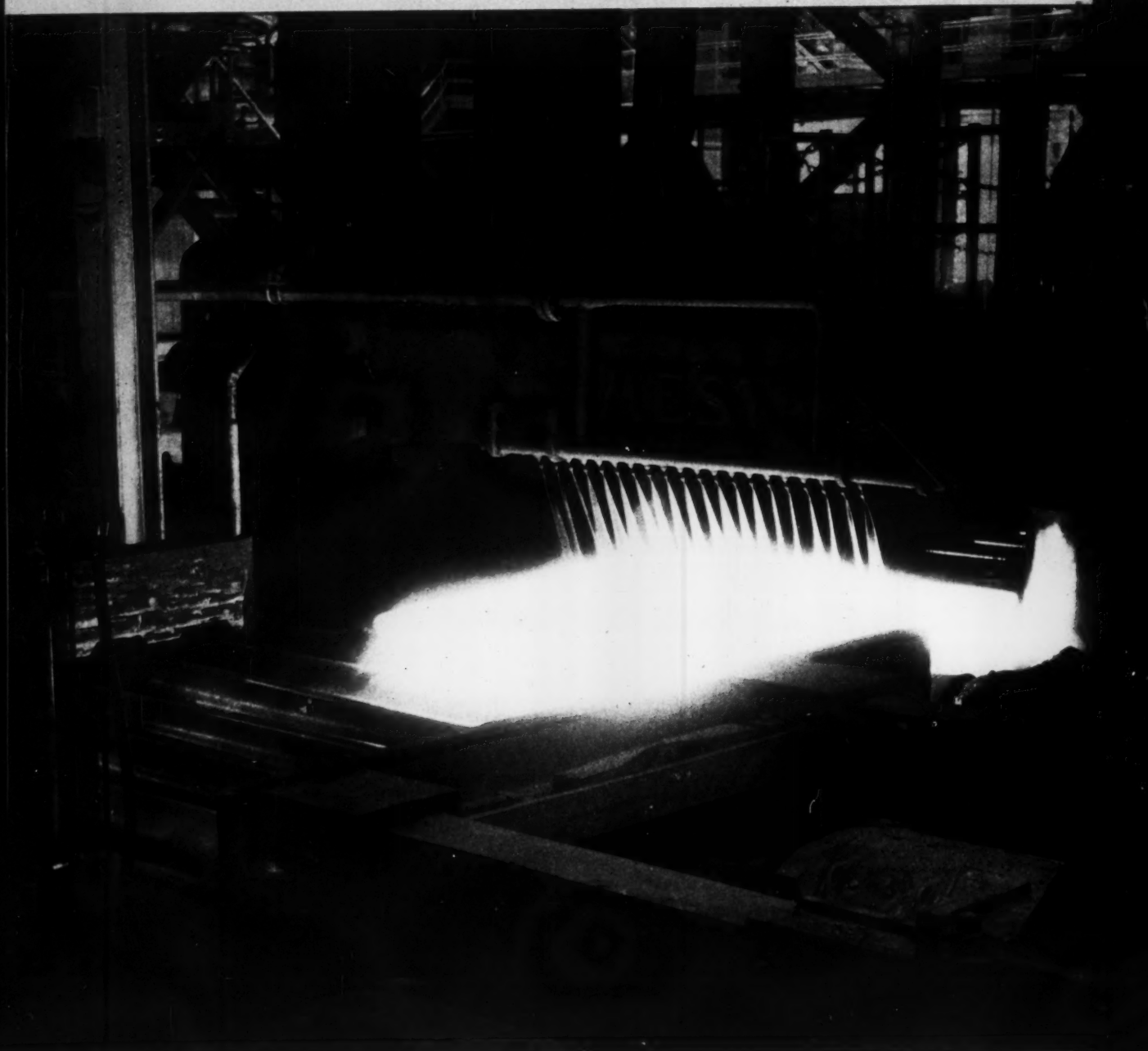
SECOND OPERATION: *Microhoning ball stud to secure final size, sphericity and finish. Single spindle machines also available.*

For Further Information, Write To:

MICROMATIC HONE CORP.
8100 SCHOOLCRAFT AVENUE · DETROIT 38, MICHIGAN

DE LAVAL
CENTRIFUGAL PUMPS

for high-pressure

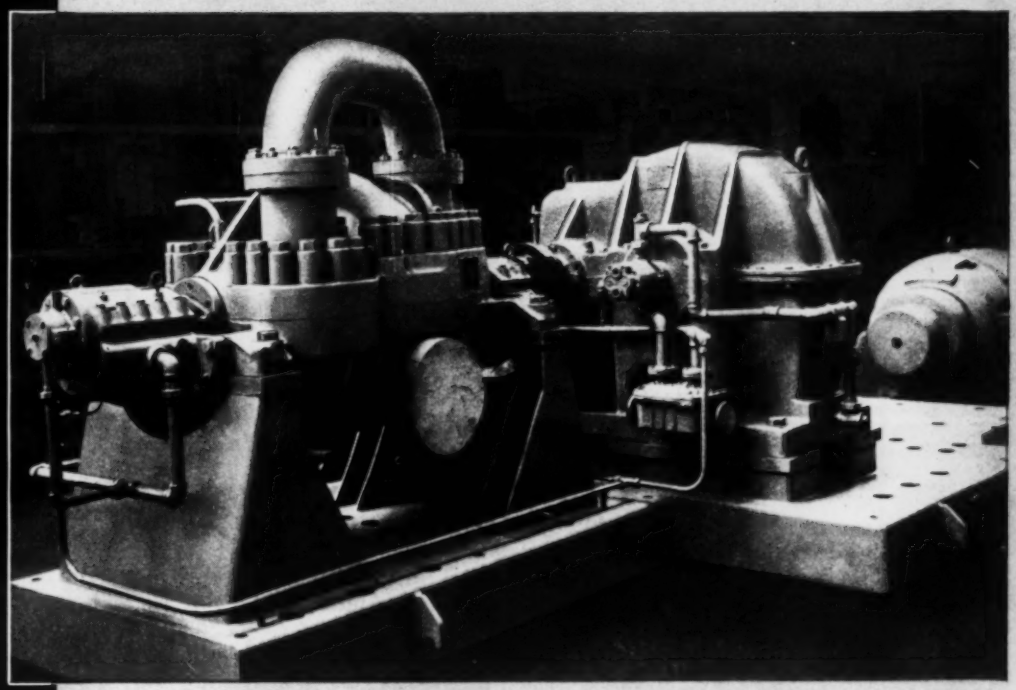


descaling at Lukens Steel

Latest successful technique of high-pressure descaling is now being performed in this modern steelmaking facility designed by Mesta Machine Co.

The initial high-pressure descaling operation uses De Laval split-case multi-stage pumps as shown in the photograph below. Each pump supplies cold water at 1000 gpm and 1600 psig. Electric motors rated at 1750 hp drive the pumps through speed increasers which raise the speed from 1200 rpm to 4250 rpm.

De Laval pumps also serve Lukens on a 1200 psig descaling system in another section of the Coatesville, Pa. mill.

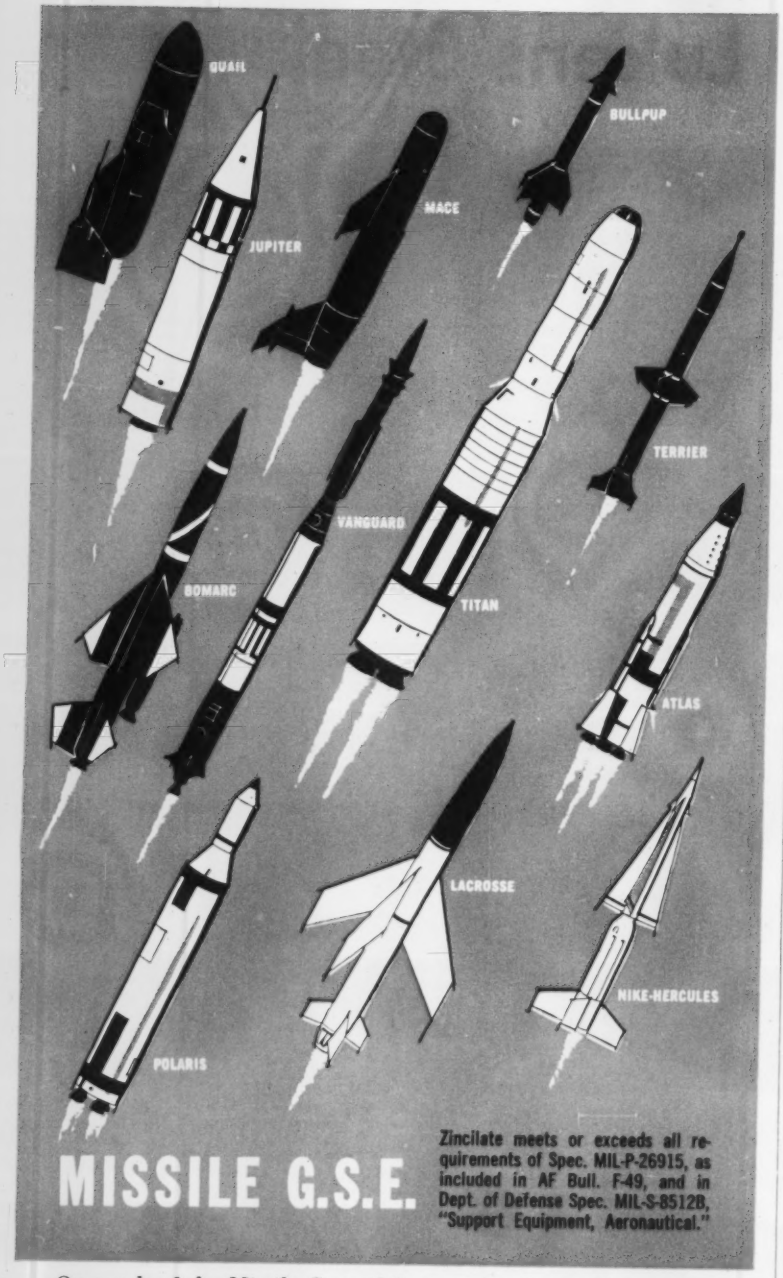


One of several arrangements available for descaling service at pressures of 1000-1200-1600 psig and capacities to 2200 gpm.

DE LAVAL *Steam Turbine Company*

860 NOTTINGHAM WAY, TRENTON 2, NEW JERSEY

D-1479



On much of the Missile Ground Support Equipment being produced today, the 1-coat Zincilate finishing system has replaced more costly multi-coat systems. This means simply that a single coat of Zincilate provides as much or more protection than three or even four coats of the materials formerly used. Further, the Zincilate 1-coat system eliminates five of the six cleaning operations required under the old methods. You can give your product —military or commercial—the best protection possible, and still cut your finishing costs, by using Zincilate. Write today for complete information.

PROTECTION that SELLS your PRODUCTS

INDUSTRIAL METAL PROTECTIVES

410 Homestead Ave. • Dayton 8, Ohio • BAldwin 2-6747, 2-6748

(*Concluded from Page 82*)

Kodakon will provide Porter with complete tool and die fabrication facilities. It will be integrated as a department in the plant being completed for Porter and the Waco Forms Div. in Schiller Park.

NEW ADDRESSES

Jones & Laughlin Steel Corp. moved the headquarters of its **Container Div.** to the firm's general office in Pittsburgh. The division's operations, engineering, accounting, credit, and technical service departments will be relocated. The sales force will continue to operate from New York. Jack E. Morris has been appointed general manager of the division. C. K. Hubbard will remain in New York as assistant general manager.

Metalmasters Inc., producer of aluminum and zinc diecastings, moved to 5725 Ravenswood Ave., Chicago 26, Ill.

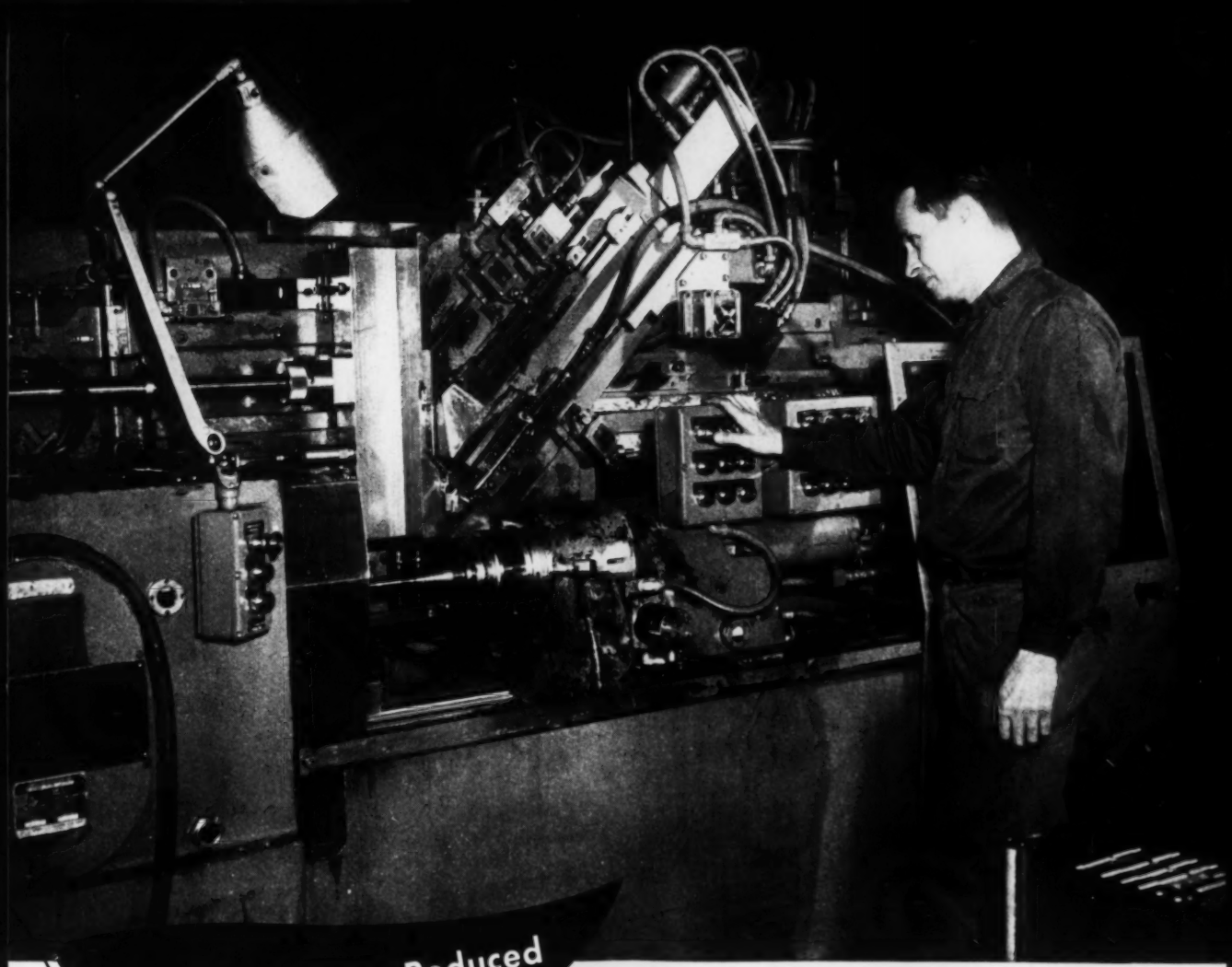
Langevin Div., W. L. Maxon Corp., moved the headquarters for engineering, sales, and administration to 475 Tenth Ave., New York 18, N. Y. Production facilities are at Old Forge, Pa.

NEW OFFICES

Titan Metal Mfg. Co., Bellefonte, Pa., a division of Cerro de Pasco Corp., opened a direct mill sales office in the Guilford Bldg., Elm and Washington Streets, Greensboro, N. C. C. L. Miller is district sales manager. The firm makes brass, bronze, and aluminum products.

Horsburgh & Scott Co., Cleveland, manufacturer of industrial gears and speed reducers, will open a Chicago area office Sept. 1 with R. S. Eisenbrown as manager.

Republic Mfg. Co., Cleveland, maker of hydraulic valves, opened an office at 15844 Strathern St., Van Nuys, Calif. The staff includes Carl Drenske, manager; Stewart Cozza, sales engineer; and Alan Pinch, service engineer.



Machining Time Reduced Over 25%

on Valve Bodies with . . . . .

BULLARD

HYDRA-FEED LATHE

This "dollars and cents" saving is made possible, according to the National Supply Company, Toledo, Ohio, manufacturers and distributors of oil field equipment and supplies, for the following reasons: Minimum set-up time; Rugged construction; Ease of operation and Flexibility of feed rates.

Further, they are completely satisfied with the Bullard Hydra-Feed and, if ordering another machine for the same job, would consider purchasing another Bullard Hydra-Feed Lathe.

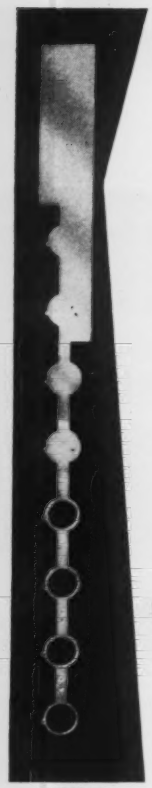
You, too, will share this enthusiasm for the Bullard Hydra-Feed Lathe — ask your Bullard Sales Engineer, Distributor or write for full information to

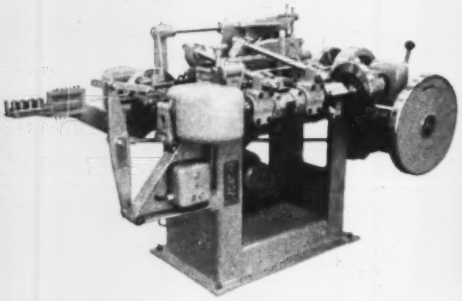
THE BULLARD COMPANY

BRIDGEPORT 9, CONN.

STAMPING COSTS TOO HIGH?

Combine Operations on a NILSON!





1" Wide

¾" Wide

Stamping costs soar when additional operations must be performed. But a Nilson 4-Slide with built-in press combines stamping *and* forming into one automatic operation . . . no secondary handling . . . ensures product uniformity.

The electronic component shown at left is made of spring-tempered Phosphor bronze, .010" thick. Specifications called for .0002" tolerances on critical dimensions —and allowed a total cumulative error of only .001"!

Solution: A simple progressive die and ingenious 4-slide forming tools are producing this piece at the rate of two finished parts per second. Production costs are substantially lower than if tooled for a conventional press.

With *nine* standard working motions available on a Nilson 4-Slide, production performance is limited only by the ingenuity of the tool designer!

If you produce wire forms or small metal stampings, Nilson's 4-slide forming techniques can point the way to lower costs. Send prints or sample parts for engineering recommendations.

Write today for the Nilson General Catalog on Automatic 4-Slide Equipment.

Parts & production data, courtesy of Plaza Tool & Die Corp., Long Island City, N.Y.

NILSON

THE A. H. NILSON MACHINE CO.

605 Bridgeport Avenue • Shelton, Conn.

AUTOMATIC WIRE & RIBBON METAL FORMING 4-SLIDE MACHINES • WIRE & STOCK REELS • WIRE STRAIGHTENING EQUIPMENT • AUTOMATIC STAPLE FORMING MACHINES • SPECIAL WIRE FORMING EQUIPMENT

Coming Sept. 14

Improving Marketing

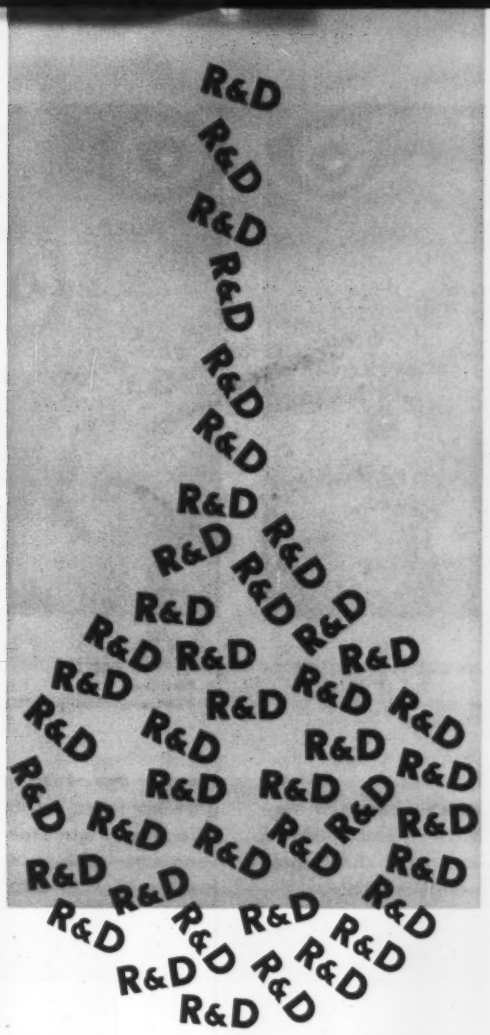
Too many managers handle marketing as they did in 1939 when metalworking sales came to only $17.7 billion. In 1959, you should be geared to a dollar volume at least eight times the 1939 level.

Because of increased volume alone, metalworking managers' marketing role has changed dramatically in the last two decades. But the kind, the distribution, and the location of markets have changed importantly, too. To improve your marketing, to keep your managerial productivity at par, see the next article in STEEL's 1959 Program for Management.

Articles in the series published to date:

1. **Profile of Metalworking's Managers (Feb. 16, p. 137).**
2. **Improving Productivity (Mar. 16, p. 103).**
3. **Keeping Wages in Line (Apr. 13, p. 95).**
4. **Giving More Public Service (May 18, p. 99).**
5. **Meeting Foreign Competition (June 15, p. 131).**
6. **Keeping Pace with Technology (July 13, p. 95).**
7. **Increasing Research, Development (Aug. 17, p. 87).**

An extra copy of these Program for Management articles is available until the supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.



THE CHANGING ROLE OF METALWORKING MANAGERS

Increasing Research, Development

"SHOW ME how much a firm is spending for research and development, and I'll tell you whether its stock is a good risk," a Wall Street habitue commented at lunch recently.

"Not me," countered his companion. "First, I want to know how it's spending the money."

The Wall Streeter's companion was a company vice president. He was expressing a growing concern of many metalworking executives. Industry is pouring more and more money into R&D—$430 million was spent in 1945, $1.18 billion in 1950. This year the estimate is $5.3 billion.

But is industry getting its money's worth? Is R&D as efficient as manufacturing or purchasing or accounting?

Most managers admit the answer is no!

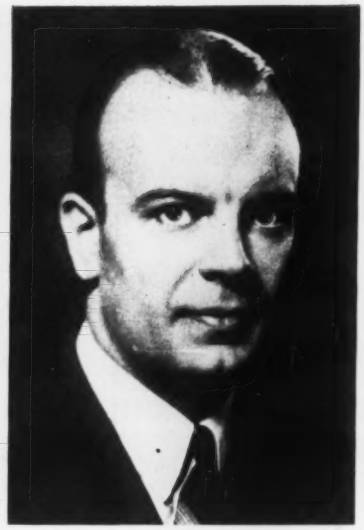
Basic reason: Research and development is a relatively new management function. Most companies are still trying to learn the best way to integrate it with all other functions.

Research and development— basically applied research and product improvement for the purposes of this discussion—moved from the campus to industry by necessity during World War II. The accomplishments were tremendous. Managers were quick to recognize the potential, and like our vice president friend, they began to pour money into company programs.

A Target Lesson

"Many of us learned a hard lesson," he relates. "With government contracts, Uncle Sam sent us a check each four to six months,

Five Steps To a Bigger Payoff In R&D



BENNETT ARCHAMBAULT
President
Stewart-Warner Corp.

His philosophy: Close control and maximum liaison between top corporate officials and division managers help gear R&D programs to corporate objectives.

HERBERT P. BUETOW
President
Minnesota Mining & Mfg. Co.

Head of one of the nation's fastest growing firms, he credits creation of a proper atmosphere for its researchers—plus a king sized incentive—for its R&D success.

as the project progressed, in payment for a phase completed. It was an ideal situation. The company gambled no money. Our researchers gained valuable experience and knowledge.

"Then we appropriated $125,000 for research on our own project," he recalls. "Nine months and $80,000 later the R&D manager walks in and says he'll need another $80,000 to come up with a prototype—and it'll be minus several features the sales manager deemed necessary. Marketing took a new look and revised its sales estimates downward. Then engineering and manufacturing rehuddled and announced that they couldn't tool up and make the item at the target selling price. A higher price was impossible because of a competing product."

What made the difference?

"The targets," explains the vice president. "With our government work, time and technical success were the only goals. Our project had an equally important third target—it also had to be a commercial success."

Harry Clayton, executive vice president of John A. Patten Management Engineers Inc., explains it this way: "You don't find many company presidents or top managers who've come up through research and development because it's a relatively new function. Yet these top managers have to administer an activity they know little about.

"Compounding the problem is an R&D manager who is basically a technical specialist and has had little experience with such activities as cost accounting and market research. Too often we find a basic lack of communications: Top management hasn't specifically outlined what it wants or expects from R&D. Similarly, R&D often fails to indicate what it can do and accomplish."

Attacks for Improvement

Few activities can expand as rapidly as R&D has in the last 15 years and not be subject to a great deal of slippage and waste. Every manager contacted by STEEL stressed that R&D expenditures will continue to increase. But they are also putting greater emphasis on getting more for their money.

Here is how they are going about it:

• **Upgrading the R&D function and reorganizing it for greater efficiency.** "R&D can't be a fire fighter on day-to-day problems for sales and production and do a good job of developing new products in its spare time," says Russell M. Frink, di-

NELSON C. DEZENDORF
General Manager
Electro-Motive Div.
General Motors Corp.

Complete emphasis on product improvement wasn't enough. He established a new post: New products co-ordinator, with the primary responsibility of developing new markets and new products.

RUSSELL M. FRINK
Director of New Products
Wolverine Tube Div.
Calumet & Hecla Inc.

A marketing manager reports to him directly. Reasons: This marketer is not distracted by day-to-day sales problems. Another basic job: Interpret the impact of changing technology on markets.

RICHARD F. BERGMANN
Vice President Engineering
Link-Belt Co.

"New products and product improvement have to become a way of life." His company's R&D activities have produced an average of one new product or major improvement per month this year.

rector of new products, Wolverine Tube Div., Calumet & Hecla Inc.

• **Working at better techniques to co-ordinate R&D with the other management functions.** "It seems to me," points out Bennett Archambault, president of Stewart-Warner Corp., "that many of R&D's failures have been due less to the caliber of the R&D organization itself than to poor administration and lack of company objectives."

• **Paying greater attention to the "people" problems.** Paul Goudy, chief engineer for Industrial Controller Div., Square D Co., echoes the sentiments of many managers: "Leadership and administrative abilities are becoming increasingly important. You have to keep an eye cocked for two types of individuals: 1. The man who can draw the most effort from a team. 2. The creative researcher who'll discover a new product that'll put the company into a completely new market."

Population growth does not insure you a commensurate market growth. Many executives shudder at the thought of what would happen to the auto industry if people start to think of the car as merely a mode of transportation and decide to keep theirs for six years.

New Status for R&D

Intelligent long range planning dictates that you upgrade your R&D function to the same organizational level as sales, finance, production, and purchasing, emphasize most managers. New products and product improvements are primarily a commodity of the laboratory. Best results can be obtained only if that function is effectively integrated with all other management activities.

Take project screening and selection. They are probably the most important phases in over-all R&D function, yet most researchers can indicate only the probability of technical success and approximate costs.

Here are the questions one firm uses in its screening of projects. They dramatize the need for integrating R&D with other functions:

1. Will there always be a use for this or a similar product? Is its use limited by economic, seasonal, or regional factors?

2. Will the product be difficult to copy? Highest priorities go to products covered by strong patents and manufactured by a process unique to the company.

3. Does the product fill an unsatisfied need or do a job better,

faster, and cheaper than a competing product?

4. What effect will technological change have on the product?

5. What effect will the production and sale of the proposed product have on present management talent and facilities?

6. Are our present customers good prospects? Or will we have to develop a whole new market?

7. How much of a threat do competitive factors pose? Will the product compete against that of a major customer?

8. What customer service requirements are involved? Can the company meet these satisfactorily?

9. How much time will be required to develop the product and get established in the market?

10. Will the material requirements enhance our purchasing position, such as permitting larger quantity orders?

11. Can present production facilities be used? What about labor requirements?

12. Is there a possibility of upgrading or utilizing present production byproducts?

Those factors also indicate the degree of constant two-way communication required between R&D and other functions, a job handled by a new product committee in most firms. At National Cylinder Gas Div., Chemetron Corp., such a committee includes top management and the department heads of each major product group, such as gas equipment, machine section, electric arcwelding.

The committee gets a progress review of all active projects, including actual and estimated time and money targets, at monthly meetings, says A. F. Chouinard, R&D director, adding:

"These are sessions in which the signals are likely to appear which would dictate any change in our projects—stop completely, make additional market survey, alter the product's features, speed up the project, take a new tack."

Are you keeping pace?

More Money Is Going into R&D

	Total Expenditures*	Industry Spends
1959††	$11.0 billion	$5.3 billion
1957	8.2 "	4.3 "
1956	6.5 "	3.25 "
1954	4.14 "	1.60 "
1952	3.75 "	1.43 "
1950	2.87 "	1.18 "

What Metalworkers Spend

Industry	Expenditures as a percentage of sales†
Agricultural Machinery	1.3%
Aircraft	4.4
Autos	5.0
Construction Machinery	1.5
Electrical Machinery	4.8
Engines & Turbines	4.0
Fabricated Metal Products	2.1
General Industrial Machinery	2.9
Instruments	5.2
Metalworking Machinery	2.1
Miscel. Manufacturing	2.2
Nonferrous Metals	2.0
Steel	1.0

††STEEL estimate.
Source: Office of Secretary of Defense.
Total figure includes government, industry, universities, private institutions.
†Based on American Management Association survey in 1958.

Money

"How much money should we spend?" crops up early in any discussion of R&D programs. There are no formulas. But the real pros, like Herbert P. Buetow, president of Minnesota Mining & Mfg. Co., offer this advice: "We don't think setting a specific percentage of sales is very important. What is important is the number of ideas and projects we have to work on."

At 3M, division managers submit R&D budget requests for the

Check these when asking . . .

Are You Getting Your R&D Money's Worth?

1. How well is your R&D program integrated with company goals? Has top management outlined the specific objectives it expects from R&D?
2. If your R&D expenditures are less than 2 per cent or more than 5 per cent of sales, a re-evaluation might be in order. While dollars spent are no criterion of the effectiveness of R&D, you should be able to justify wide variances from industry averages.
3. How balanced is the scope of your R&D activities? Is it so narrow it restricts the researchers' explorations to the danger point: Where changing technology in competing processes and materials may obsolete your product or facilities?

   Is it so broad that researchers can waste time and money on projects of doubtful value to you?
4. Are you losing money and efficiency through poor personnel policies, such as bogging down your most creative men with administrative duties?
5. Are your facilities, procedures and personnel (professional-technician ratio) in good balance to permit maximum efficiency?
6. What incentives do R&D employees have to make the best utilization of their time and talents and your money?

Suggested by John A. Patton Management Engineers Inc.

year ahead. They outline the status of active projects and describe new projects on tap. Top management reviews the budgets in this light and then determines what revisions are necessary.

Wolverine Tube's R. M. Frink adds this observation: "If your product's being challenged by changing technology or a better competitive product, how do you put a price tag on the research necessary for company survival?"

A broad guidepost can be found in the table on Page 90. (It shows the average percentage of sales different industries spend for R&D.)

Stewart-Warner's divisions are each charged a fixed percentage of sales for research and development—whether they spend the money or not. The approach is not as arbitrary or loose as it sounds. When Mr. Archambault joined the firm five years ago, he set up a system of close control and maximum liaison between top corporate management and division management. He points out:

"There's no incentive for a manager to hold the reins on R&D to show a better profit on his operations. Each division's new product committee must meet at least once each six weeks to review projects in progress and evaluate possible new projects. Detailed minutes of the meetings are sent to all other divisions and corporate officials.

"This does three things," adds Mr. Archambault.

"1. It prevents serious duplication of effort among the divisions. It also permits each division's managers to make constructive suggestions on work being undertaken by other divisions. Crossfertilization of ideas is plus factor.

"2. It develops a healthy competitive factor among divisions.

"3. It helps top management keep all R&D activities geared to overall corporate objectives."

Productivity Inside

So far, we've explored research and development as a new management function which must be fully integrated with all other functions for maximum effectiveness. The problem of getting the most from your R&D dollar behind the laboratory doors is equally pressing.

You can't regiment ideas and creativity. But you can boost R&D's "productivity" by attacking the people problems. Some people are more creative than others. Some are better administrators. Some work better alone. Some work better in groups.

Few functions in industry offer more opportunities to place individuals into the environment for which they're best suited. Yet it's a common complaint that "the only way to get a raise or improve yourself around here is to get into administration."

More and more medium and small firms are following the example of giants like Westinghouse Electric Corp. and General Electric Co. They're developing programs with parallel opportunities for salary and advancement in both administrative and technical careers.

Placing the Pegs

John A. Patton Management Engineers recommends the use of the psychological, personality, and in-

terest inventory tests to help slot research personnel. "We're still seeing too many of the most creative people being bogged down with administrative duties as a reward for their creative accomplishments."

An eastern research manager relates that his department's productivity has risen substantially in the last 18 months through a program emphasizing better utilization of technicians by the professional researchers. "A good professional should be able to keep two technicians busy full time," he believes. "Wherever it's possible we don't want the researcher to spend his time setting up testing equipment, running the tests, chasing down blueprints, and similar tasks."

Cost-consciousness is a must in the industrial laboratory, and it represents one of the major facets in the changing role of the R&D manager. Because the project must be a commercial success, research managers are bringing cost accountants into their activities.

True, you can't tabulate costs and time on basic creative efforts. But the farther you get from truly basic research toward product improvement, the more practical it becomes to keep accurate tabs on costs.

Pinpoint the Costs

The exhibit on this page was developed from a form used by Mr. Chouinard at National Cylinder Gas. "Estimates are based on experience," he explains, "and it's surprising how accurately you can estimate the cost of a proposed project when you break it down into the component tasks. These are the estimates used in presenting the probable costs to top management. The chart is also good for pinpointing sources when costs start to get out of line."

The marketer is also joining the R&D team to help boost its productivity. Eugene F. Hill is a marketing manager who reports to the director of new products at Wolverine Tube. "Two major advantages in such an approach help us increase our R&D batting average," Mr. Hill relates.

"1. While I do maintain close liaison with the marketing people in our sales function, I devote my full time to our efforts to find and develop new products and

To get more for your dollar . . .

Keep Closer Tab on R&D Costs

DESIGN TIME		
Approximate concept time		
Literature, patent searches		
Approximate design time		
Purchasing inquiries		
TOTAL		
DRAFTING TIME		
Layout drawings		
Sketches for model		
Semifinished drawings, spec sheets		
Revision time		
Photos		
TOTAL		
MODEL TIME		
Mfg. of parts and assemblies		
TOTAL		
COST OF PURCHASED PARTS		
COST OF OUTSIDE DEVELOPMENT		
TOTAL		
TESTING TIME & TRAVEL EXPENSE		
In the laboratory		
In the field		
Travel expense		
TOTAL		
REPORTS		
To marketing		
To production		
TOTAL		
TOTAL DEVELOPMENT COSTS		

markets. I am not distracted with current marketing problems.

"2. A marketing man completely integrated with R&D is a natural watchdog for changing technology and its impact upon the company's products and markets and work underway in its laboratories. Detergents, for example, were not developed by the soap companies but by the chemical industry. Conceivably, a marketing man functioning with the R&D departments of the soap firms might have been able to spot the development in advance so that the soap firms could have entered the field much more quickly than most of them did."

Wanted: Better Motivation

Researchers are human, and a satisfactory approach to incentives for them would be welcomed by most managements. Commented one executive vice president: "Sure, we pay them to come up with ideas—it's their job. We also pay sales and production people for a job—but we've found that incentives will boost their productivity. We're looking for the right answer."

Perhaps it can be found in Minnesota Mining's philosophy of operating its New Products Division: "All our work is on projects involving products unrelated to our present products," explains John Pearson, manager. "Project ideas may come to us from the outside, from our division laboratories, from 3M's central research lab, or our own division staff.

"The company has always operated under the policy that our researchers may devote 15 per cent of their time on work of their own choosing—this provides the stimulus to the urge in all researchers to be the originator of a new product line.

"The New Products Division complements that philosophy. Suppose the individual gets an idea for a product unrelated to that of his division. He can pursue it on his free time to the point where he believes he feels his idea is ready for project status. He sells the idea to his supervisors, perhaps even gets additional money and assistants to further develop his brainchild.

"If the idea continues to have merit, it can be shifted to New Products Division—the individual moving with it if he desires. Here he must continue to show project progress to keep the project active and maintain his budget. Other researchers with special skills may join him. As the project grows, so may the team. The big moment arrives, of course, when the team can take its product to top management and sell it as the nucleus for a new division. If successful, the team moves out of the laboratory as the managers of a new enterprise."

Although some firms have no strict policy, they give achievement awards to researchers who develop new products that have an unusual impact upon the company's operations.

Piecework Approach

One midwest metalworking research director is trying to develop a "target savings bonus" approach. The idea: "Set up time and budget objectives for all projects—much as we do now. If the team completes its project with an expenditure below its appropriated budget, it divides a percentage (probably 50 per cent) of the savings."

The Case for Basic Research

When Electro-Motive Div. of GM brought out its first 567 series diesel engine in 1938, the machine developed 1325 hp in a freight type locomotive. A piston operated for about 60,000 miles. The armature of a traction motor had to be rewound about every 250,000 miles.

E-M had an R&D program aimed at product improvement which was as successful as any firm could claim. The same locomotive today —it has over 45,000 part numbers— is about the same size as the 1938 version. But today's model develops 2400 hp with the same displacement. Pistons and traction motor armatures run over 1 million miles.

"The bottom fell out of the diesel locomotive market in 1953," recalls Nelson C. Dezendorf, general manager. "The impact on our company was tremendous. We suddenly realized our shortcoming in stressing only product improvement. We needed new products and new

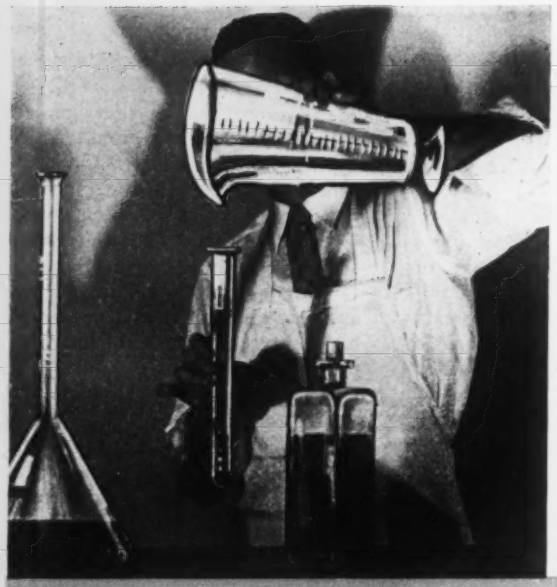
To get more for your dollar . . .

Use Outside R&D Organizations When:

1. **Your staff is overloaded with other high priority projects.**
2. **You lack necessary capital for needed facilities to conduct the research.**
3. **You are out of ideas and feel a need for a fresh approach.**
4. **The area of investigation is outside the experience or interest of your own researchers.**
5. **The project requires a great diversity of specialized talent.**

Don't Use an Outside Organization:

1. **Just to see how someone else will tackle the problem.**
2. **To compete against your own researchers.**



From lab man to top manager . . .

3M's Incentive System

Here's how a researcher at Minnesota Mining & Mfg. Co., St. Paul, can be rewarded (and it has been done):

In his free time, the researcher conceives the big idea and does preliminary development.

He sells his supervisors on the potential and gets a budget and staff to further development of the project.

As the project progresses and a product evolves, other men with talents to contribute—including marketing and cost accounting—may join the team.

The product takes shape, customers are sighted, manufacturing technique is established. The team approaches top management with a proposal for a whole new division.

Top management gives the green light. The team moves out of research into the management of its own new enterprise. And the lab man who originated the idea heads the new operation.

markets—so we established the position of new product co-ordinator and reorganized our R&D efforts into three activities:

"1. Product improvement. 2. New product and new market searches designed to fully utilize our present product and facilities. 3. Research in the areas totally unrelated to our products, such as atomics and the free piston engine."

Most R&D programs are aimed at product improvement and applied research. A few thoughtful executives are voicing concern about an industrial parallel to the Electro-Motive experience. Privately, they agree that industry is not contributing its share to basic research which provides the base for technological improvements. Dr. Werner von Braun, the Army's missile expert, expressed it this way:

"We've talked too much about hardware and too little about filling the vat of knowledge. We've been taking from that vat for years and have put little or nothing into it. Now we're scraping the bottom."

Commented one company president: "It's difficult to justify a basic research program to your stockholders unless you're a giant like GM or GE. Certainly, the logical approach is through contributions to universities or some sort of pooling approach—perhaps by an industry for a specific area of research.

"If we refill this vat of knowledge that Dr. Von Braun describes, we should be able to get more for our R&D dollar in applied research. Research is very much a competitive thing—it's the best tool we have for competing for tomorrow's markets, domestic and world-wide."

This is a foreman dressing for work!

Time was when Pete wore the grubbiest work clothes he could find. He *had* to—with all the trouble-shooting he did. And as production fell behind he sometimes even had to fill in on a machine. What a waste of a good foreman!

Today, you'll find Pete in a white shirt—and tie. No longer does he do other men's work. Now he's the real right hand his management needs and wants.

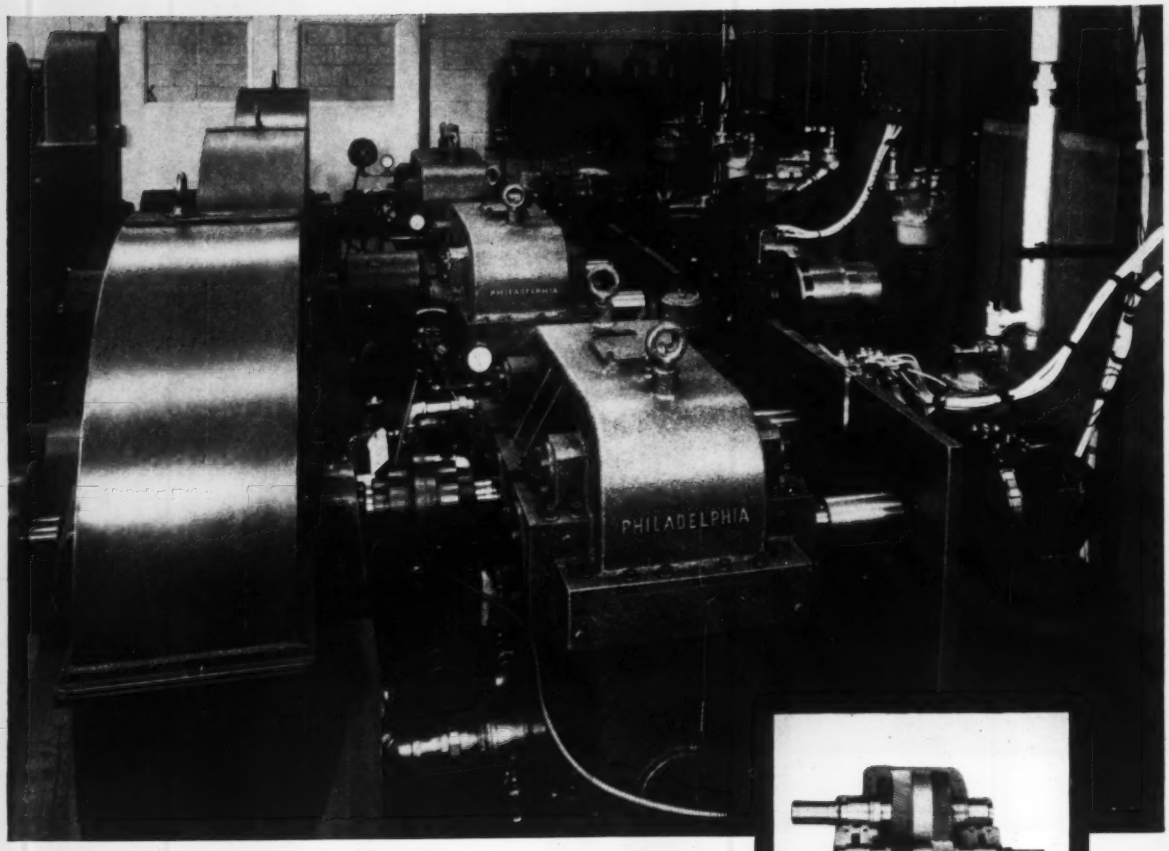
Automatic Keysort Data Processing made the difference! Automatic Keysort now helps Pete and his management plan *in advance*, reports performance at every stage. Man-hours are used more profitably... and experienced foremen like Pete are free to concentrate on supervision, work assignments, production flow. Without extra bookkeeping, without having to pitch in themselves.

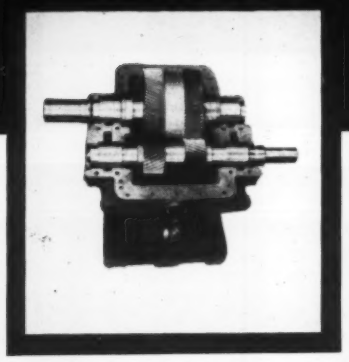
Automatic Keysort's easy-to-use machines and punched cards require no specialized personnel, no restrictive procedures. Designed to fit your business as it stands and as it grows, Keysort will give you all the fast, accurate information you need for modern management control of every factory operation. And at remarkably low cost.

To learn more about how Automatic Keysort Data Processing can fulfill *your* needs for timely, comprehensive facts and figures, call your nearby Royal McBee Data Processing Representative, or write Royal McBee Corporation, Data Processing Division, Port Chester, N. Y., for brochure FS-33.

ROYAL McBEE · *data processing division*

NEW CONCEPTS IN PRACTICAL OFFICE AUTOMATION





PHILADELPHIA HI-SPEED INCREASERS drive simulated "test flight on ground"...

Testing of jet aircraft electrical power systems calls for exact duplication of tortuous flight conditions in the lab . . . *complete to supersonic speeds!* At General Electric Aircraft Systems Engineering Laboratory above, three Philadelphia speed increasers drive generators for simulating conditions of both low inertia, high acceleration reciprocating engines and high inertia, low acceleration jet engines. Each stand is powered by a 200 HP DC motor coupled to a Philadelphia 5.8:1 speed increaser. The drive system provides for adjustable speed at rated continuous power from 4000 to 12000 rpm with overload capacity of 300 HP for five minutes and 400 HP for five seconds.

To meet these exacting requirements for performance and continuous operation, Philadelphia HI-SPEED drives offer exclusive advantages in drive design . . . advantages you can't get anywhere else. Double opposed helical gearing is precision hobbed, precision tooth ground and dynamically balanced. Symmetrically arranged gearing balances loads on bearings and shafts. Shaft deflection is minimized . . . bearings last longer.

Philadelphia HI-SPEED Drives are available in standard units for speeds to 10,000 rpm at pitch line velocities to 10,000 fpm. 1 to 7100 HP. Ratios from 1:1 to 10:1 for high speed reduction or increase. Special HI-SPEED drives are furnished for higher speeds, horsepowers and ratios. Write today for your copy of our HI-SPEED catalog.

PHILADELPHIA GEAR CORPORATION
Erie Avenue and "G" Street, Philadelphia 34, Pennsylvania

philadelphia gear drives

Offices in all Principal Cities • Virginia Gear & Machine Corp., Lynchburg, Va.

INDUSTRIAL GEARS & SPEED REDUCERS • LIMITORQUE VALVE CONTROLS • FLUID MIXERS • FLEXIBLE COUPLINGS

SEE COST CUT IN TITANIUM— An electrolytic process for producing ductile titanium which may result in cheaper titanium with higher purity is foreseen by officials of Norton Co., Worcester, Mass. Easily obtained titanium carbide forms the anode of an electrolytic cell; 99.6 per cent pure titanium crystallizes on the cathode. The same process will produce equally pure crystals of other rare metals like tantalum, hafnium, or columbium.

PORCELAIN HOMES— Porcelain enameled homes may reappear if plans of U. S. Steel, Pittsburgh, and Ferro Corp., Cleveland, mature. Fenestra Inc., will make the porcelain panels in its Detroit plant.

PROTECTS MOLTEN METALS— Silicone oil floating on the surface of molten metal prevents oxidation, claims Union Carbide Corp., New York. But 450° F is the temperature limit.

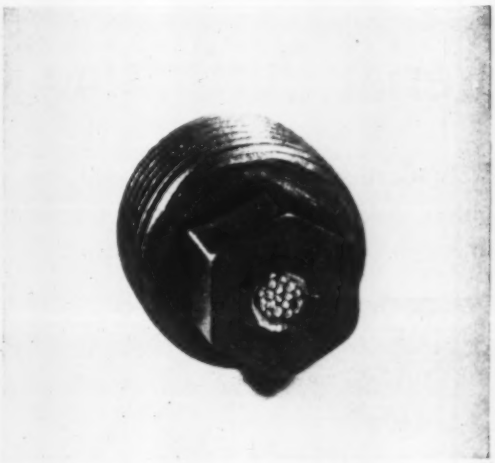
CLAD BUMPERS TESTED—Bumpers clad with stainless steel rather than chrome plating are being tried out on 60 Mack buses. The stock, furnished by Allegheny Ludlum Steel Corp., Pittsburgh, was formed on a standard 1000 ton press.

NEW ELECTRON SOURCE— Silicon carbide may replace the heated filaments in vacuum tubes and at least retard the swing to transistors, insists Westinghouse Electric Corp., Pittsburgh "Such a device would combine many of the advantages of semiconductors and vacuum tubes," explains Dr. Clarence Zener, director of research.

RADICAL APPLIANCES AHEAD— Keeping up with the new ideas appliance people are working on will be difficult, S. C. Johnson & Son Inc., Racine, Wis., predicts. Already in R&D departments are these, the firm avers: Remote control cooking; ultrasonically equipped closets for overnight dry cleaning; washing machines that wash, dry, sanitize, press, and fold; a freezer-refrigerator that delivers food to a stove, which cooks and serves it; and a gadget that scrubs, rinses, waxes, and polishes floors all by itself.

WANTED: SMALLER DRIVE UNITS— Machinery and machine tool builders want smaller gear units that will handle more power, says the American Gear Manufacturers Association, Washington. The trend is increasing because buyers demand better control and greater precision in processing—for example, grinding after heat treatment, use of alloy steels, and gearing with more hardness.

PROBING EXOTIC METAL USES— Spacecraft applications for exotic rare and refractory metals are being studied by McDonnell Aircraft Corp., St. Louis, which has $1 million of U. S. Air Force money for the project. Goal: An airframe that won't melt at 4000° F.



PLUGS WITH VENTS can often be Rube Goldberg creations. This one's much simpler and easier to make. At Pipe Plugs Inc., Wellington, Ohio, production men drill a hole in their cold forged plugs, then fill the hole with copper shot. The shot is compressed in the hole, resulting in a porous vent

COST CRISIS . . . How to Beat It

Standardization Trims Material Purchasing Costs

Material standardization can help beat the cost crisis. It did for these two companies. Here's how they got their savings through more efficient purchasing

VALUE ANALYSIS is standard operating procedure in the Purchasing Dept. of Burroughs Corp., Detroit. Here are two examples where the business machine manufacturer has cut costs through material standardization.

In the first case, the company has standardized on material sizes to save $14,250 per quarter in quantity extras. In the second example, Burroughs has switched from special to standard tolerances and from cold rolled to hot rolled steel to save $555 per unit on a giant sorting machine.

Walter Thorne, purchasing manager, says this rule of thumb is used by purchasing: Tack on 20 per cent of the initial material costs to cover interest rates, taxes, storage, and handling costs. That's why he pays special attention to potential savings like these in selecting and stocking materials.

Strip Program Saves $57,000 A Year

IN NORMAL operations, Burroughs releases quarterly orders for more than 3 million lb of strip steel which is used to make some 12,000 different kinds of business machine parts. Until last year, most of this steel was purchased already slit in widths ranging from 1 to 4¼ in. The bulk of it was ordered in lots of 10,000 lb or less. Quantity extras alone added an average of 50 cents and size extras added 25 cents per 100 lb to the total price.

Purchasing suggested it could cut costs if it bought wider steel coils and did its own slitting. It began analyzing the steel ordered for each kind of part. In one case, it found it was placing separate orders for as little as 157 lb of steel a year.

The study isn't finished, but in its last quarterly buy, Burroughs has released orders for 3.1 million lb of strip steel. Only 450,000 lb was ordered slit and cut to length. Another 780,000 lb was ordered slit to special sizes. The rest was ordered in coils in several standard widths between 4½ and 12¾ in. That cut the number of sizes stocked by 75 per cent.

Because it was released in lots of 20,000 lb or more, quantity and size extras have been eliminated and $14,250 saved. On a projected basis, that adds up to $57,000 a year. Additional savings in scrap reduction, storage, and handling costs can be applied to amortizing the cost of the slitters.

Unit Costs Cropped $555

A GIANT mail sorting machine is one of ten which Burroughs is building for the Post Office Department. It takes 12,000 lb of 11 gage cold rolled steel for its structural framework. The steel is cut to size in 12 and 4 ft sections. Tolerances are plus or minus 1/64 in. The steel is cadmium plated for corrosion protection.

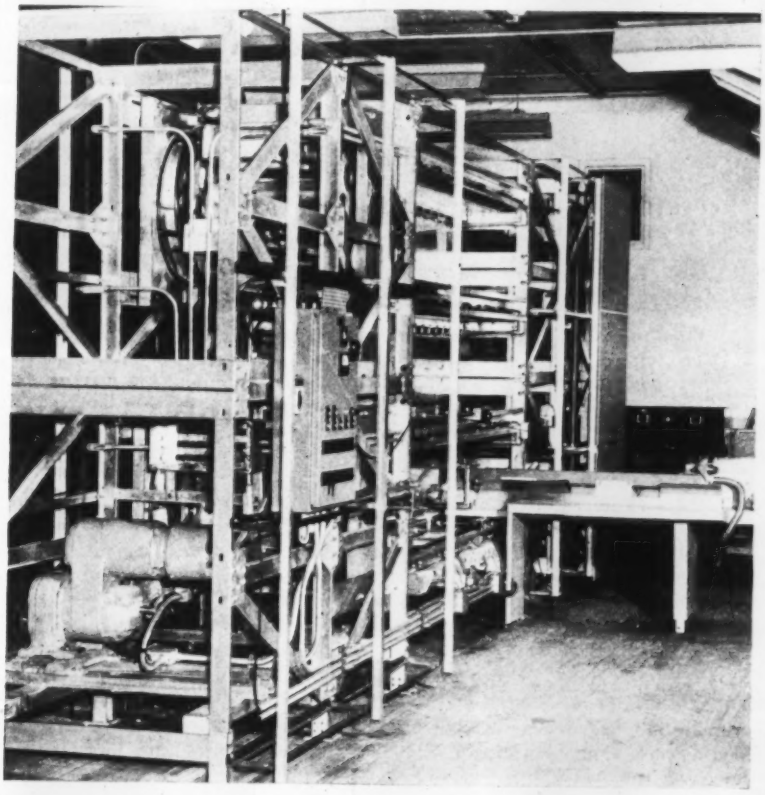
On most of Burroughs' machines, it's common practice for the company to specify special tolerances on 90 per cent of the cold rolled strip it orders to insure part reliability. But because of the length of the mail sorters (78 ft), the company felt it should double check every tolerance to see if it could eliminate some of those specifications.

At the same time, purchasing was taking a long look at hot rolled strip to see if it could be plated satisfactorily and still meet specifications.

That would make for a potential cost savings of $4.10 per hundredweight over cold rolled steel. Minor design changes were instituted to permit the switch.

Result: Burroughs has saved $75 per unit by using standard rather than special tolerances. It has saved $480 by switching from cold rolled to hot rolled strip. Total savings: $555 per sorter.

When assembly is complete, this mail sorter will be 78 ft long. A switch from cold to hot rolled stock, and a move to standard tolerances, save $555 per sorter



Material Switch Cuts Costs 16.4 Per Cent

Based on 230 tons per month

		—Composite Cost
Before:	Strip Coil	$42,435
After:	Sheet Coil	35,475
SAVINGS		$6,960

SWITCHING from cold rolled coil strip to cold rolled sheet coil has saved Dura Corp. $6960 a month in material purchases. The Oak Park, Mich., firm has been able to pass some of those savings on to customers. The rest have helped it meet higher labor and material costs to maintain a better competitive position.

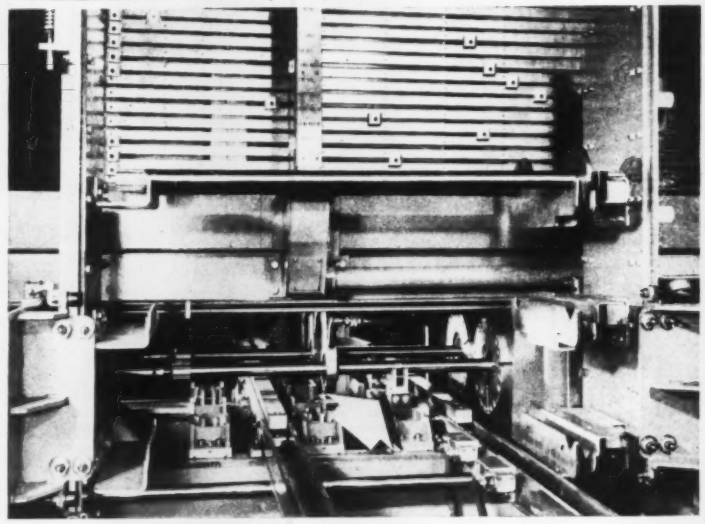
Dura Corp.'s eight divisions manufacture a variety of products ranging from lawn mowers and automotive window regulators to wheel balancers, jacks, and lifts for service stations. Several of the divisions used cold rolled strip to make 30 or 40 different types of production stampings. The steel ranged between 16 and 20 gage and was used in widths from 3 to 9 in. Tolerances averaged plus or minus 0.002 in. Total consumption was 400 tons a month.

• **Big Switch**—In studying steel orders, the Purchasing Dept. felt the company could switch to another type of steel at considerable cost savings. Purchasing experience showed that sheet steel had improved to the point where it commonly maintained closer tolerances than AISI specifications require. Those tolerances seemed to be satisfactory for most of the stamping jobs the company had. By paying a 25 cent per hundredweight premium, the firm could specify drawing quality to forestall possible production problems on some of the parts.

Purchasing made a cost analysis, then informed division managers of the potential savings. The divisions purchased sample coils of sheet to make sure it would work satisfactorily. Result: The company has switched 70 per cent of its strip coil purchases to sheet coils. There have been no increases in reject rates or inventory costs.

Induction Hardener Helps Axlemaker Eliminate Warping, Prune Costs

Switch from 4150 steel to 1041 is made possible by new Westinghouse machine, which turns out a workpiece in a minute. Torsion and fatigue strength are boosted



Cam rack (top) and vertical arrangement permit operator to stock axles on notched bars which lower them onto a horizontal loader (shown retracted). During loading, induction coil-quenchant rings remain at extreme left over centers. Arrow (lower center) indicates stops that control warping during hardening

HORIZONTAL induction hardening is enabling a major builder of tractors to save 54 cents a unit through a switch from SAE 4150 to SAE 1041 carbon steel for axles.

The horizontal technique, says the designer, Industrial Electronics Dept., Westinghouse Electric Corp., Baltimore, delivers these benefits:

1. Greater tensile strength—290,000 psi vs. 185,000 formerly.
2. Increase in torsional breaking strength—217,500 in.-lb with 1041 steel vs. 156,500 with 4150.
3. Elimination of straightening. (A second firm estimates straightening costs at 50 cents an axle.)

In addition, you need no warmup time, and control of hardness depth and residual temperature, factors in cracking, is better. "You can achieve a fatigue strength of 65,000 psi compared with less than 25,000 psi for an older method which required a hand straightening," says a third axlemaker.

• **Westinghouse people call their method of controlling distortion a major improvement in induction hardening.**

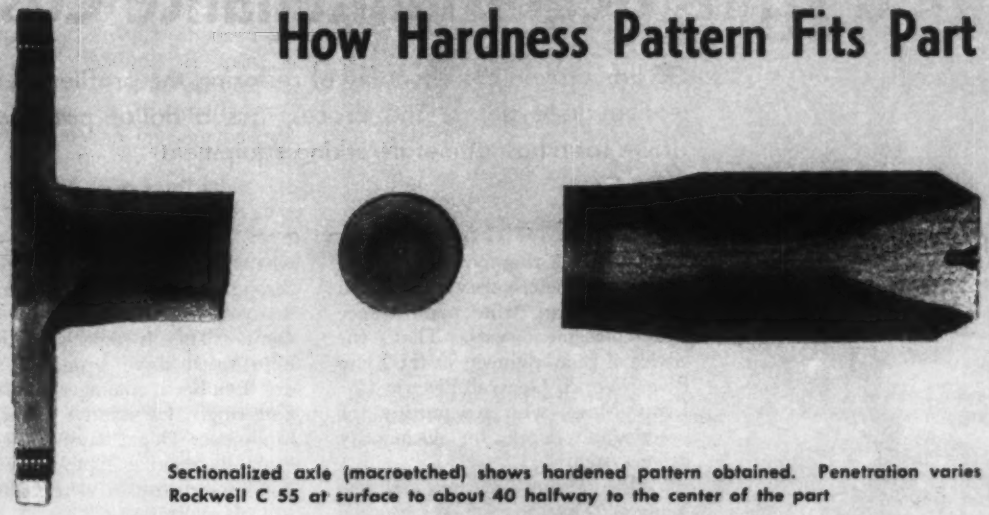
"This new unit can increase torsional strength 100 per cent," says Bob Storey, induction heating laboratory supervisor. He cites this example: "You can get 55,000 in.-lb out of a 1.34 in. axle that has been hardened in a furnace. But put the same piece in our low distortion machine, and it is possible to obtain 110,000 in.-lb." A 50 per cent increase is the least you can expect.

In hardening axles in furnaces, heat treaters have to watch the stock closely for cracking. The axles are straightened mechanically following hardening, introducing adverse strains.

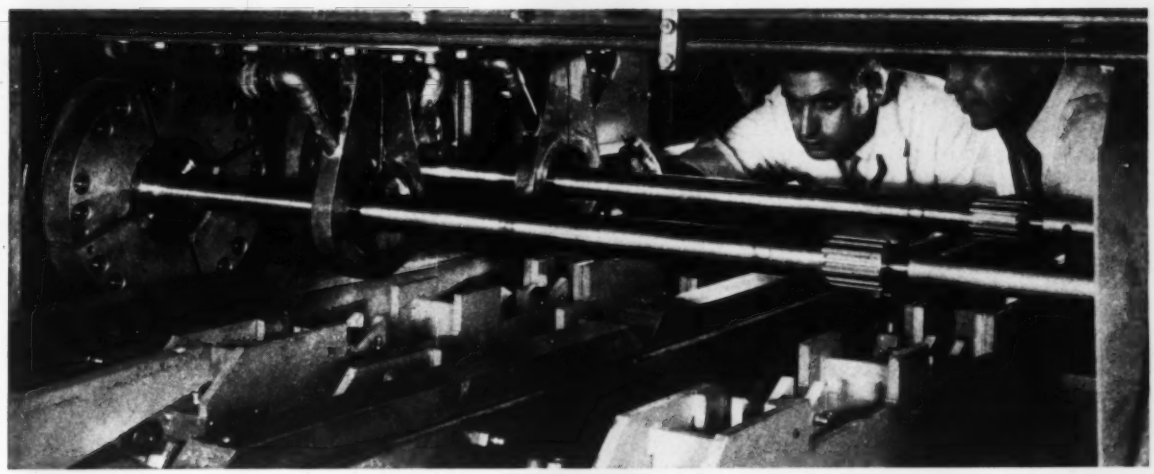
Induction heating offers more precise control of the heated depth, making it possible to replace a furnace-treated alloy steel with a low carbon type.

Many early induction hardeners handled the axles in a vertical fixture. "But the horizontal idea we adopted isn't enough," says Dick Wuerfel, Westinghouse metallurgist. "You must carry the technique a step further and regulate mechani-

How Hardness Pattern Fits Part



Sectionalized axle (macroetched) shows hardened pattern obtained. Penetration varies Rockwell C 55 at surface to about 40 halfway to the center of the part



Engineers Bob Storey and Jim Peach make last minute adjustments in heat-quench coils. Cooling rate is regulated by changing scanning speed, wettability of the coolant, and pressure

cal movement during hardening."

Flange clamping and adjustable rests or stops are provided near the center of the machine bed. They limit the amount of warping during heating so that runout or bow is held within specifications.

• Automatic features permit one man to load four machines while they run by themselves.

The new model Westinghouse has just completed for International Harvester Co., Chicago, is an example. Several axles are placed on the vertical loader. As the machine indexes, two axles (they can be 2 to 5 ft long) are moved into position between chucks and centers. While the axles rotate, induction coils and quenching sprays move along the axles at 1/10 to 1/4 in. per second.

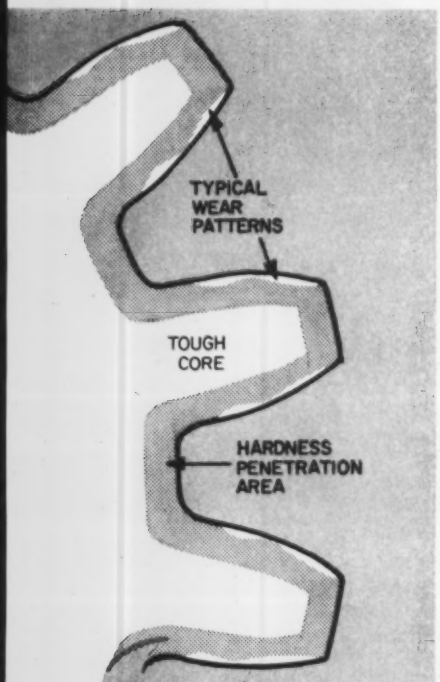
A cam rack at the top of the machine maintains positive control of scanning, quenching, and heating cycles. Cams are easily adjusted to fit changes in the axle cross sections. All movements are hydraulic.

All hydraulic valves have been placed on one panel to simplify maintenance. The machine requires only 18 sq ft of floor space.

• An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.

Regrind Trims Gear Maintenance Costs

GE has proved the economy of restoring the profiles on locomotive drive gears. The process has a dollar potential on drives for a host of metalworking equipment



This cross section of a tooth form shows how wear destroys the profile. Generally, if the wear is less than half the case hardened depth, profile restoration may pay off

RESTORING the tooth profile in drive gears before they have worn excessively can trim maintenance and replacement costs. That's the advice of gear engineers at the Lynn River Works, General Electric Co., Lynn, Mass., who are putting the practice to work on locomotive drive systems.

"What we have learned ought to be applicable to some industrial drive systems," says A. H. Prucknicki, gearing project engineer.

• **New Life** — GE is offering the service to customers. It regrinds involute profiles to original tolerances, removing pitting, scuffing, and scoring. Repair & Renewal Parts Sales Section, Erie, Pa., has responsibility for the service.

Another advantage is cited by Mr. Prucknicki: "Badly worn gears, where the profile has been altered through wear, accelerate damage to many other parts of the drive equipment. This is especially true in high speed drive systems." Richard Lamborn, manager, motor engineering, Locomotive and Car Equipment Dept., says: "Tests on some locomotive types show traction motor stresses were reduced 5 to 1 after restoration."

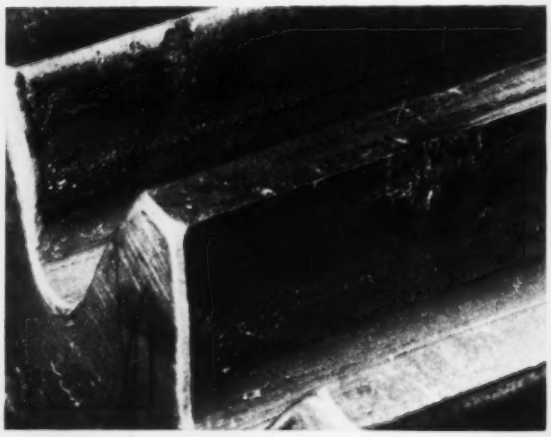
• **How Do You Know?**—Since restoration of the tooth form necessitates some metal removal, the process will work best on the drives that can tolerate slight increases in backlash. Unless the gears are subjected to severe torque reversals or variations, the gear restoration program may be economical.

Here are some checks GE suggests to its customers:

DANGER: These are warnings of trouble

PITTING usually results from heavy overloads and inadequate lubrication

SCORING of teeth can be attributed to particles of foreign matter in the lubricant



• **Check the amount of wear on the teeth.** If the gear is hardened, the wear should be no more than about half the depth of the hardened case. Reason: If wear, or the scuff, pit, or score patterns are deeper than that, regrinding will probably leave an inadequate hardened case.

• **Check for cracks or other mechanical defects.** Gears with deep fatigue cracks, or with cracked or broken teeth are already beyond restoration.

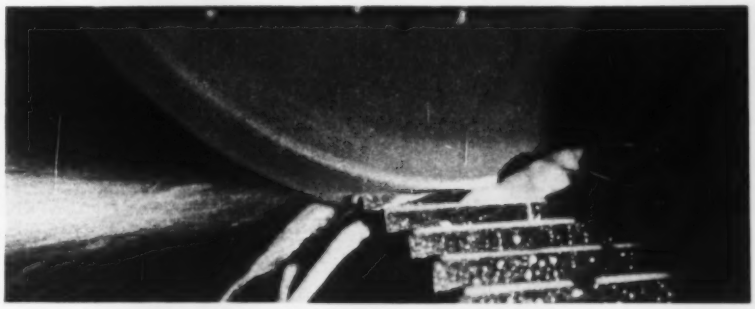
• **Check tooth hardness.** This is to make sure the teeth haven't been overheated and annealed during service.

• **Check the bore.** The fit between the gear and the shaft should be within tolerance. If the fit is no longer close enough, and if the gear meets the other restoration requirements, you may want to grind the bore to fit an oversized shaft.

• **Potential** — As part of its program, GE estimates what customers can expect to save per gear on the basis of lot sizes:

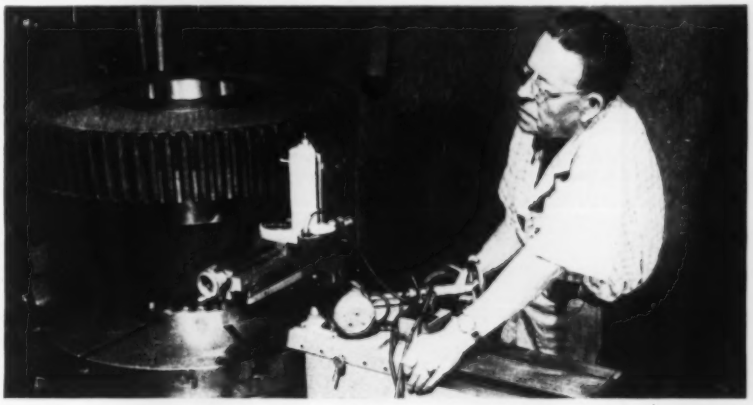
One gear: About 77 per cent of the cost of an equivalent new gear. Ten gears: Roughly 86 per cent of the price of a new gear.

Those savings may apply to your case.



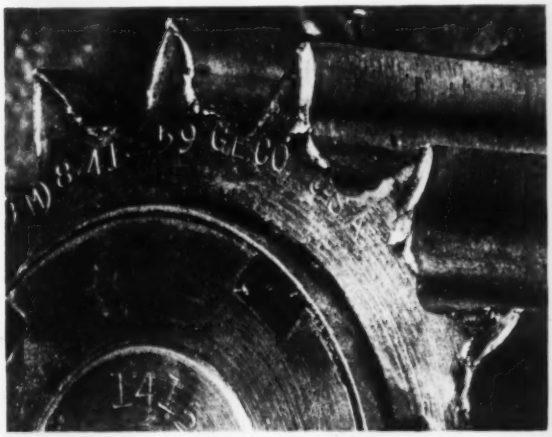
A heavy duty gear is reground at GE to restore the tooth profile and add to the useful life of the part. The process also can remove minor surface defects

After the tooth profile is restored, the gear is tested on this Anderson checker, designed and built at GE's Lynn, Mass., plant. The reworked gear must conform to the same profile tolerances as a new one

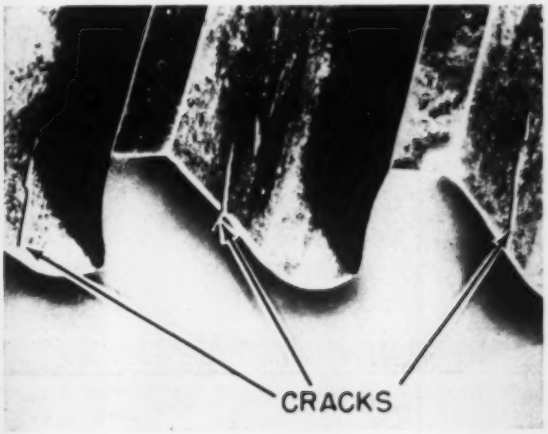


By correcting these faults in time, you may double the life of gears by regrinding the tooth profile

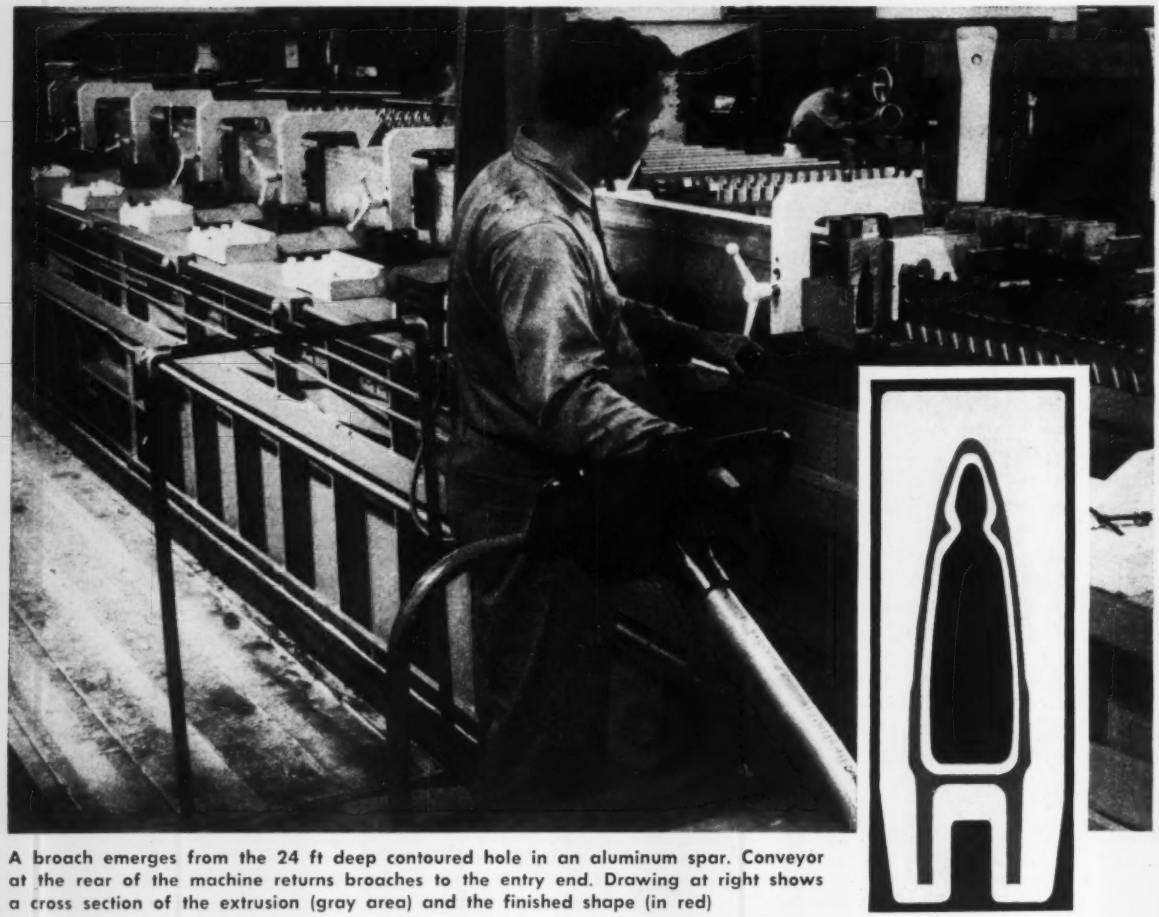
SCUFFING results from high temperature metal-to-metal contact caused by poor lubrication



FATIGUE cracks come from repeated and long term loads. This one is least likely to be reparable by regrinding



Internal Broach Takes Long Spars



A broach emerges from the 24 ft deep contoured hole in an aluminum spar. Conveyor at the rear of the machine returns broaches to the entry end. Drawing at right shows a cross section of the extrusion (gray area) and the finished shape (in red)

Designed to work on helicopter blades, the machine can be extended to handle 44 ft sections. It may represent new techniques for close tolerance machining on deep holes

SUCCESS in broaching the insides of 24 ft long main helicopter rotor blades has made it possible for engineers at Kaman Aircraft Corp., Bloomfield, Conn., to switch from a fabricated spar to a one-piece aluminum extrusion.

The contoured interior is broached in one setup on a spar broaching machine made by Lapointe Machine Tool Co., Hudson, Mass.

• **How It's Done**—Eight mechanical clamps hold the AMS 4153 high tensile alloy extrusion (it's produced at the Lafayette, Ind., plant of Aluminum Co. of America) in place on the machine and assure accurate alignment of the part.

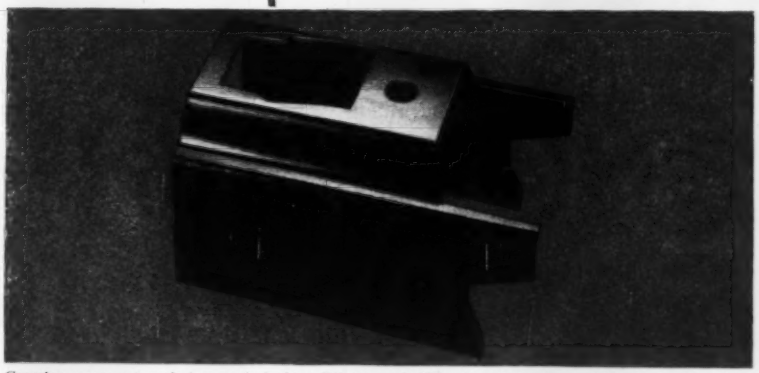
A conveyor on the rear of the machine returns the 39 broaching tools used for the job from the exit end to the entry end. The operator uses a hydraulic hoist to lift the first broach from the conveyor and put it in place on the pull bar. Starting the machine, the operator then rides a battery-operated trolley to the exit end of the spar. When the broach emerges, he uses another lift to return it to the conveyor. Next, he returns the pull bar through the spar and rides the trolley to the entry end to start a new cycle.

• **Results**—The complete cycle (removing about $\frac{1}{8}$ in. stock from the hole) takes $2\frac{1}{2}$ hours. The tools produce a finish of 30 microinches, and the hole is straight within 0.005 in. in 3 ft. The rough extrusion weighs 700 lb, the finished part 100 lb.

After broaching, the stock on the outside is removed on an Onsrud spar miller.

The machine is capable of speeds up to 80 feet a minute. It's built of building block units—other sections can added to take spars as long as 44 ft. An electromechanical drive provides a smooth pull to the tools.

PROGRESS IN PLASTICS



Complex cover part made inexpensively from Dilecto grade XF—phenolic laminate with a kraft paper base.

POSTFORMING—THE INEXPENSIVE WAY TO MAKE COMPLICATED PARTS

How it's done. Briefly, postforming is effected by heating Dilecto stock until it is pliable, then placing it in an unheated, inexpensive mold, and pressing until the laminate cools enough to retain its shape.

Less expensive. Postforming is less expensive than other molding methods, because, generally, lower-cost dies and tools can be used. Frequently, dies can be constructed of wood or plastics rather than of tool steel. Also, retooling to meet new specifications is cheaper. Dies are more adaptable. Labor costs are reduced.

Why Dilecto? Dilecto plastics laminates are excellent for postforming applications where the following qualities are required: high strength-weight ratios, superior electrical and chemical properties, and resistance to abrasion, weathering, moisture, and corrosion. Light weight is another major Dilecto asset.

Special Dilecto grades. Special Dilecto postforming grades respond to sharper bends and deeper draws, and take more complex contours without fracturing. However, most grades of Dilecto can be postformed to a limited extent. CDF Technical Bulletins 21 and 46 describe postforming grades in detail.

CDF silicone-rubber tapes insulate Electro-Flex heaters

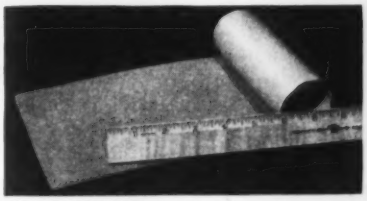
Bread on the "sandwich". Construction of Electro-Flex heaters consists of a vulcanized "sandwich" of silicone-rubber tape on both sides of patterns of resistance wire. Standard Electro-Flex heaters consist of four plies of CDF silicone-rubber tape (woven glass-fiber cloth with silicone-rubber calendered on). Each ply is .010-in. thick. For extreme flexibility, this CDF customer makes a Hi-Flex (trade name) heater.

Heat up missiles and rockets. Electro-Flex heaters are on all U.S. missiles and rockets. Typical are the Atlas, Thor, and Redstone, where they heat pipes and valves in the fuel system. Industrial applications include storage-drum heaters, heat sealing, and oven heaters – particularly small crystal ovens. CDF supplies 80% of the silicone-rubber tapes used by Electro-Flex. Request Bulletin SR-3.

Flexible Teflon-impregnated glass cloth

Combines advantages. Flexible new Dilecto GB108TED combines the high tensile strength and resistance to flow typical of glass-cloth laminates with the low permeability, excellent chemical resistance, and superior electrical properties of DuPont Teflon TFE fluorocarbon resin. It consists of glass cloth impregnated and covered on both sides with a continuous film of Teflon resin. An important advantage: freedom from pinholes.

Where it's used. Dilecto GB108TED is suitable for corrosion-resistant parts like gaskets and seals. Also for electrical insulation like radar windows, flexible printed circuits, and tape cable. It shows unusually high tear-resistance, and can be formed into simple shapes. Request Bulletin GST-58A.



Dilecto GB108TED is offered as continuous, natural-color, smooth-finish sheet in coils. Maximum width 6". Maximum length 75'.

NEW CDF LITERATURE • *Bulletins referred to in this advertisement may be obtained from your CDF representative, or you may send the coupon below, indicating the Bulletins you want.*

Please send me the following Technical Bulletin(s):

- ☐ Bulletins 21 and 46 – CDF Postforming Grades
- ☐ Bulletin GST-58A – CDF Teflon-impregnated glass cloth
- ☐ Bulletin SR-3 – CDF Silicone-Rubber tape

Name _____ **Title** _____

Company _____

Street Address _____

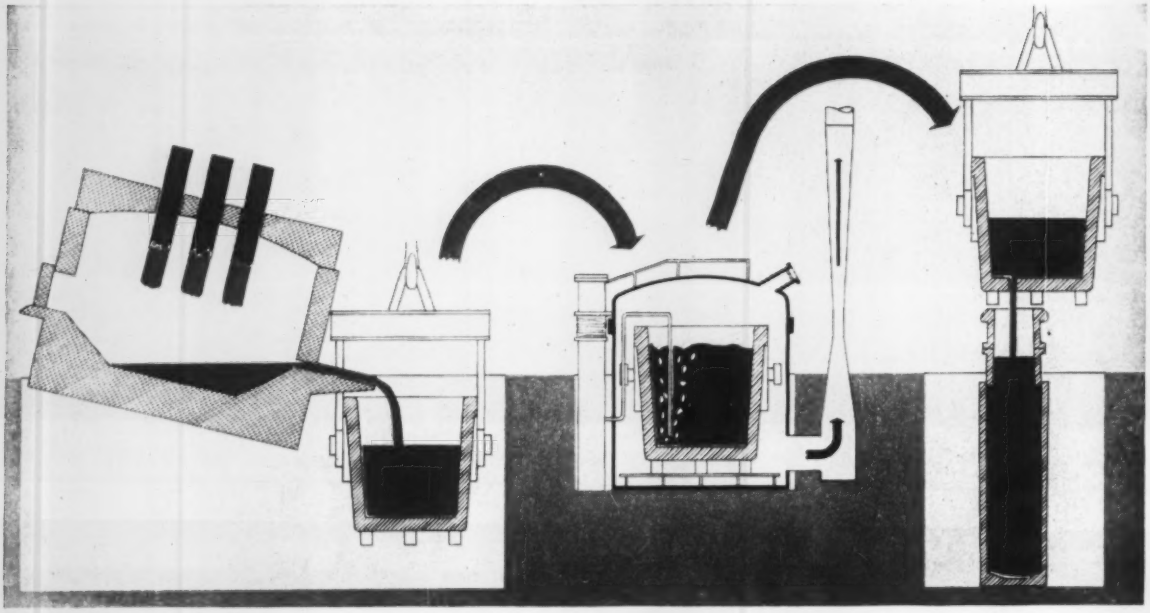
City _____ **Zone** _____ **State** _____

CONTINENTAL-DIAMOND FIBRE

A SUBSIDIARY OF THE Budd COMPANY • NEWARK 22, DEL.

In Canada: 46 Hollinger Road, Toronto 16, Ontario

Bubbling Helium Helps Degas Steel



Steel heat is tapped . . . degassed in ladle . . . and poured

HYDROGEN, villain in creating delayed ruptures, microcracks, and flaking in steel, can now be removed by a new ladle degassing process for less than 1 cent a pound.

Developed by A. Finkl & Sons, Chicago forging and die block producer, the system reduces the amount of hydrogen in a 37½ ton ladle from an average of 3.9 parts per million to 1.5 ppm in about 12 minutes.

There are three steps in the process:

• **Tapping**—Following two slagging operations, the molten nickel alloy steel is discharged from an electric furnace into the ladle at about 3000° F.

• **Degassing**—The ladle is inserted into a 1200 cu ft chamber. Four steam jet suction pumps create a high vacuum (500 microns), allowing the hydrogen, oxygen, and nitrogen gases to boil out of the melted steel. Helium gas is injected into the ladle to increase the rolling turbulence.

• **Pouring**—After 12 minutes of "cooking" the degassed metal, still about 2850° F, is poured into ingot molds.

An efficient method of degassing ladles has long been sought by steelmakers in this country and Europe. Charles W. Finkl, vice president of engineering who headed the development, credits two factors for his success:

1. The superiority of American design steam ejector suction pumps. They are turned on in proper sequence by an automatic control setup. A panel board with signal lights and instruments permits continual check on the cycle. A neoprene O-ring effects airtightness between chamber and cover.

2. The injection of helium as the purging agent via a snorkeling technique. Besides increasing turbulence, it exposes more steel to the surface. Helium also serves as a scavenger by permitting the unwanted gases to diffuse into the bubbles.

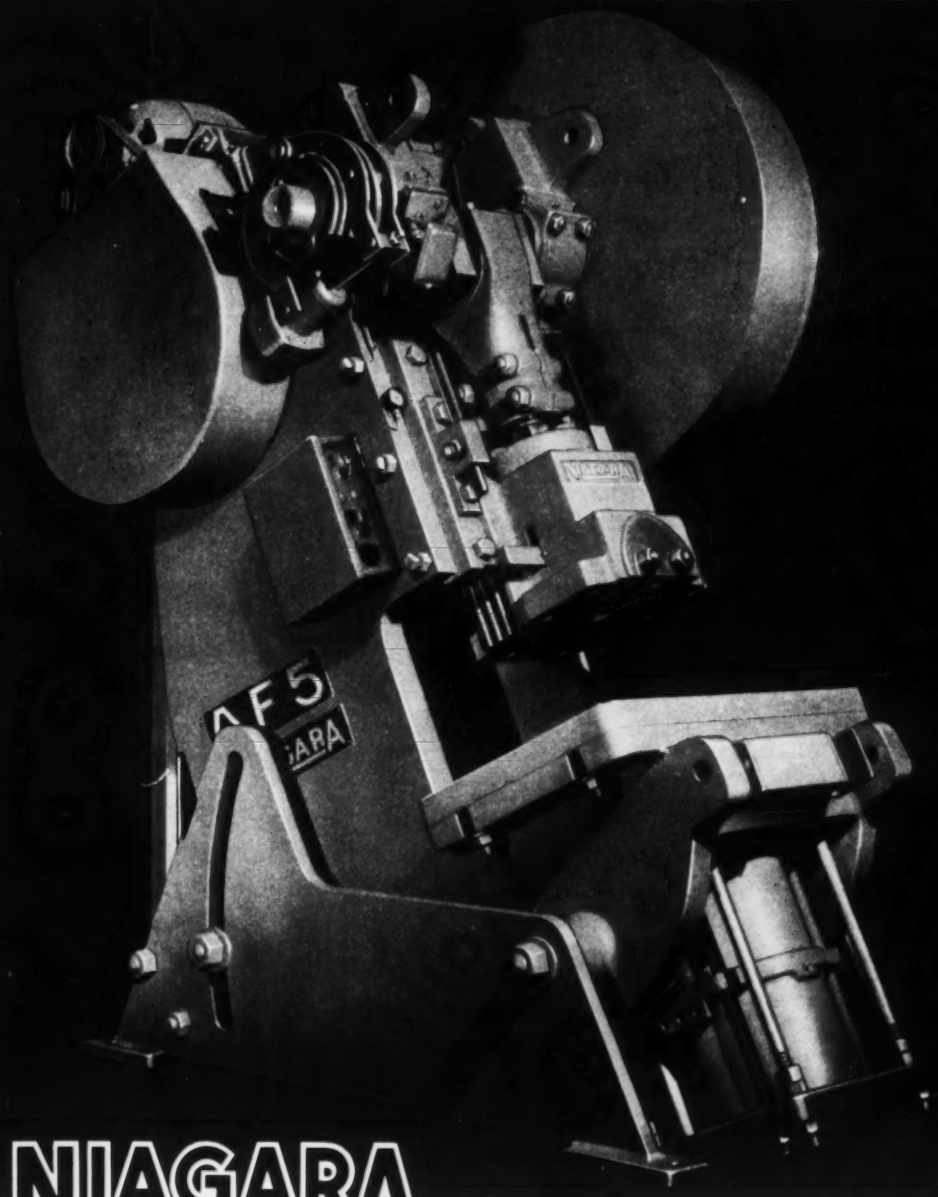
"Several major steel companies, both here and in Europe, have shown much interest in our development," says William Finkl, president.

"We have applied for patents and are setting up details for licensing arrangements."

• **Flexibility**—One of the major advantages of the Finkl process, of-

(*Please turn to Page* 110)

A GREAT NEW LINE* JOINS NIAGARA'S BIG OBI FAMILY



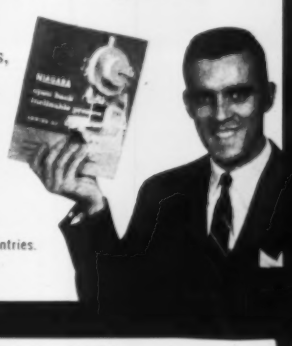
NIAGARA

Meet the new Series AF. Look it over . . . typical Niagara engineering from crown to base . . . every detail a benefit to you.

- Rugged, rigid frame for greater accuracy, longer die life.
- Unusually long, rigid slide of unique design prevents deflection of ways, solidly supports dies and extends their life.
- Exclusive multiple "V" gibbing for more guiding surface and greater resistance to off-center loads.
- Cool-running, long-wearing, pneumatic friction clutch and brake operate directly on the crankshaft . . . fewer parts to start and stop . . . faster engagement.
- Modern, rigidly supported gearing runs in sealed oil bath for long life.
- Simplified control for safer, time-conserving press operation.
- Patented one-man inclining mechanism.
- Full complement of accessories to meet your specific needs.

Look at the range: 14 sizes, geared and non-geared, shaft diameters 1¼" to 7½", capacities 5½ to 250 tons.
Niagara Machine and Tool Works, Buffalo 11, N. Y.

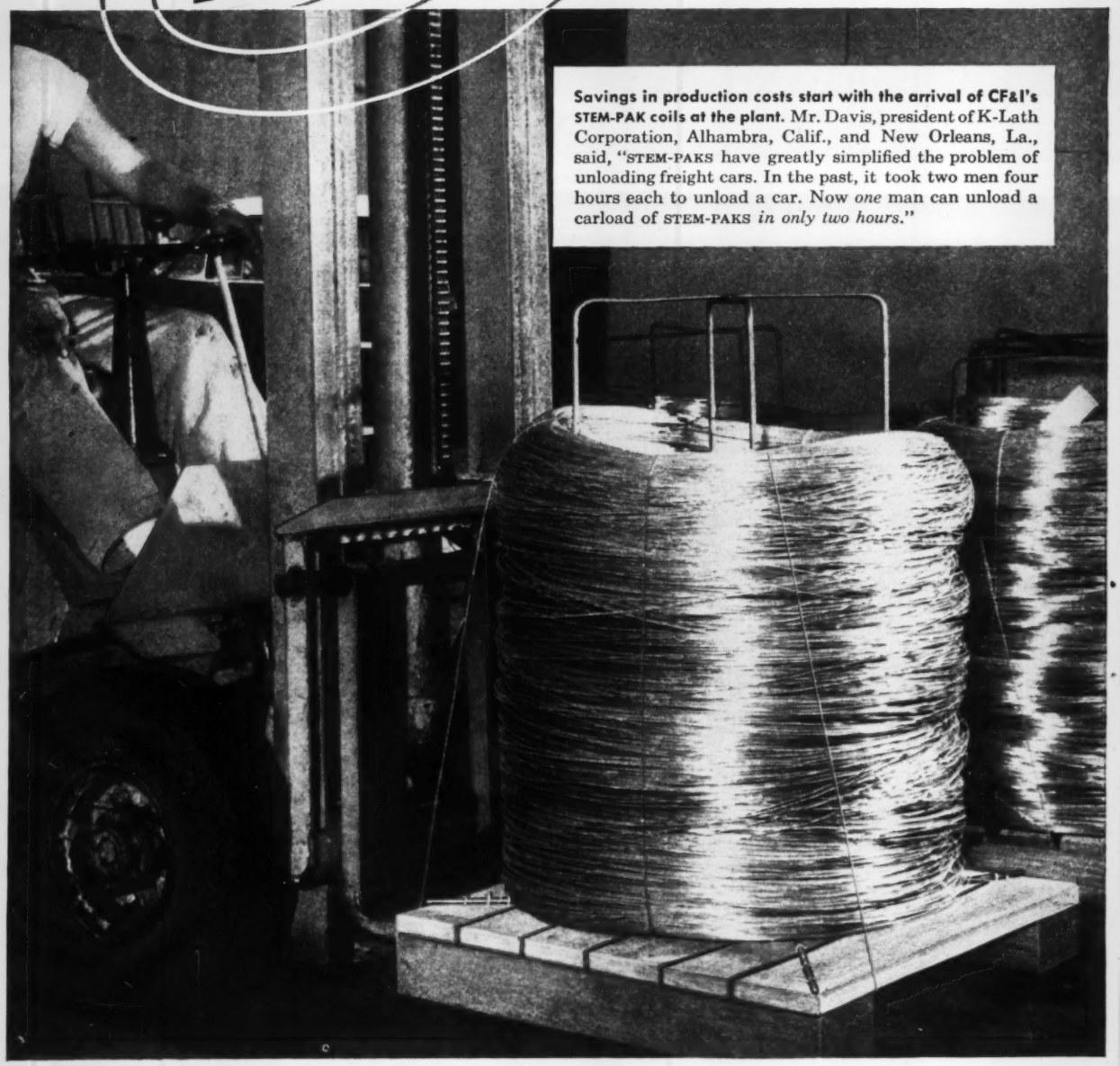
Now get the whole story . . .
Send for New Bulletin 55.



DISTRICT OFFICES: Boston • Buffalo • Cleveland • Detroit • Indianapolis • New York • Philadelphia / Distributors in principal U.S. Cities and major foreign countries.

CF&I Wire

PACKAGED for YOUR PRODUCTION



Savings in production costs start with the arrival of CF&I's STEM-PAK coils at the plant. Mr. Davis, president of K-Lath Corporation, Alhambra, Calif., and New Orleans, La., said, "STEM-PAKS have greatly simplified the problem of unloading freight cars. In the past, it took two men four hours each to unload a car. Now *one* man can unload a carload of STEM-PAKS *in only two hours.*"

helps K-LATH increase production 50%

Continuous production achieved by butt-welding the start of a new STEM-PAK to the end of a nearly expended PAK. This change-over takes less than 5 minutes. No machines are stopped. "STEM-PAK'S coils, which hold up to a half-ton of wire, permit us to run each machine as much as 1½ hours longer per day than when we used conventional coils," pointed out Mr. Davis.

K-Lath, an unusual type of lath made of kraft paper reinforced with CF&I Steel Wire, is finding wide acceptance among plastering contractors. "CF&I's clean, galvanized wire helps us to produce a brighter, better-looking product that appeals to contractors," explained Mr. Davis. "CF&I's excellent quality control also assists us in maintaining our own high standards of quality."

problem: "Our production machines are designed for the interlacing of kraft paper with galvanized wire," said Mr. Davis. "As we use about 370 miles of wire daily, our biggest problem was the time lost when we replaced the wire coils feeding our machines. The entire production line came to a halt each time we changed one of the coils."

solution: "Our request for technical assistance from CF&I was answered by a team of engineers," continued Mr. Davis. "These men developed the special STEM-PAKS which have aided us in achieving a continuous operation. Up to 75% of our production downtime — before we began using CF&I products—was caused by using too many small coils. STEM-PAKS hold 800- to 1,000-pounds of continuous, quality galvanized steel wire. These larger packages keep each machine running as much as 1½ hours longer per day. There is a minimum of tangled wire because STEM-PAKS allow free unwinding, without snarling. We have used CF&I STEM-PAKS to increase our production 50%."

Before you order wire, consider your own production problems. Then choose a CF&I wire package that can give you one or more of the following benefits:

- reduced downtime through extra-long lengths of wire
- simplified inventory control
- fast, economical unloading and in-plant handling
- assured cleanliness of the wire

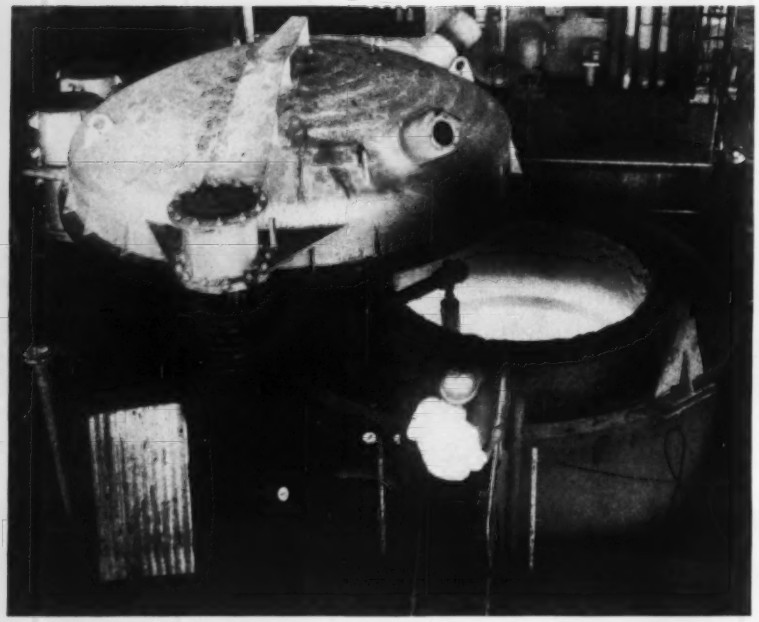
Why not contact our nearest sales office today? Our technicians will be glad to visit you and discuss your packaging requirements.

CF&I—WICKWIRE WIRE

THE COLORADO FUEL AND IRON CORPORATION

THE COLORADO FUEL AND IRON CORPORATION—Abuquerque • Amarillo • Billings • Boise • Butte Denver • El Paso • Farmington (N. M.) • Ft. Worth • Houston • Kansas City • Lincoln • Oklahoma City • Phoenix Pueblo • Salt Lake City • Wichita • **PACIFIC COAST DIVISION**—Los Angeles • Oakland • Portland • San Francisco • San Leandro • Seattle • Spokane • **WICKWIRE SPENCER STEEL DIVISION**—Atlanta • Boston Buffalo • Chicago • Detroit • New Orleans • New York • Philadelphia • **CF&I OFFICE IN CANADA:** Montreal
CANADIAN REPRESENTATIVES AT: Calgary • Edmonton • Vancouver • Winnipeg

6284



Note the quiet, clean surface of the steel in the ladle. The top of the 13 ft diameter vacuum chamber has just been removed following degassing. Vermiculite is dumped into the ladle immediately after opening the chamber to act as an insulator while the molds are poured

DEGASSING STEEL . . .

ficials claim, is that the degassed steel can be poured into molds by moving the ladle about in the conventional manner of teeming. In stream degassing, up to now the most economical degassing method, only one mold could be poured, degassing by this method being accomplished as the metal flows from the ladle through a vacuum into the mold.

Finkl is vacuum degassing about 80 per cent of the alloy steels it is using for its forgings and die blocks.

Low hydrogen, oxygen, and nitrogen content in the steel practically eliminate sparks during the pouring operation. The steel at about 2850° F pours out in a dense stream

Finishing Technique Saves $37,000

PRECISE barrel finishing with a fixture type machine solved a costly problem for American Machine & Foundry Co., saving the firm $37,000 a year in the manufacture of its Automatic Pinspotter.

The problem arose at AMF's Buffalo plant where the machine (it automatically sets bowling pins) is made. A nylon gear was wearing too quickly.

In tracing the trouble, engineers checked the gear where it meshed with the cast teeth of the distributor track. The surface finish met commercial standards for smoothness but still had small rough spots. The imperfections wore away the nylon gear at a faster than normal rate.

• Improving the track finish by usual methods required about 70 minutes for each track.

Co-operation among engineers from AMF and Almco (Queen Products Div., King-Seeley Corp., Albert Lea, Minn.) resulted in a special fixture to hold the distributor track in an Almco Model BDF-800-48-1 barrel during finishing.

In the Almco fixture type machine, abrasive flows around the part, reaching all surfaces.

A 32 microinch finish can be obtained in 10 minutes.

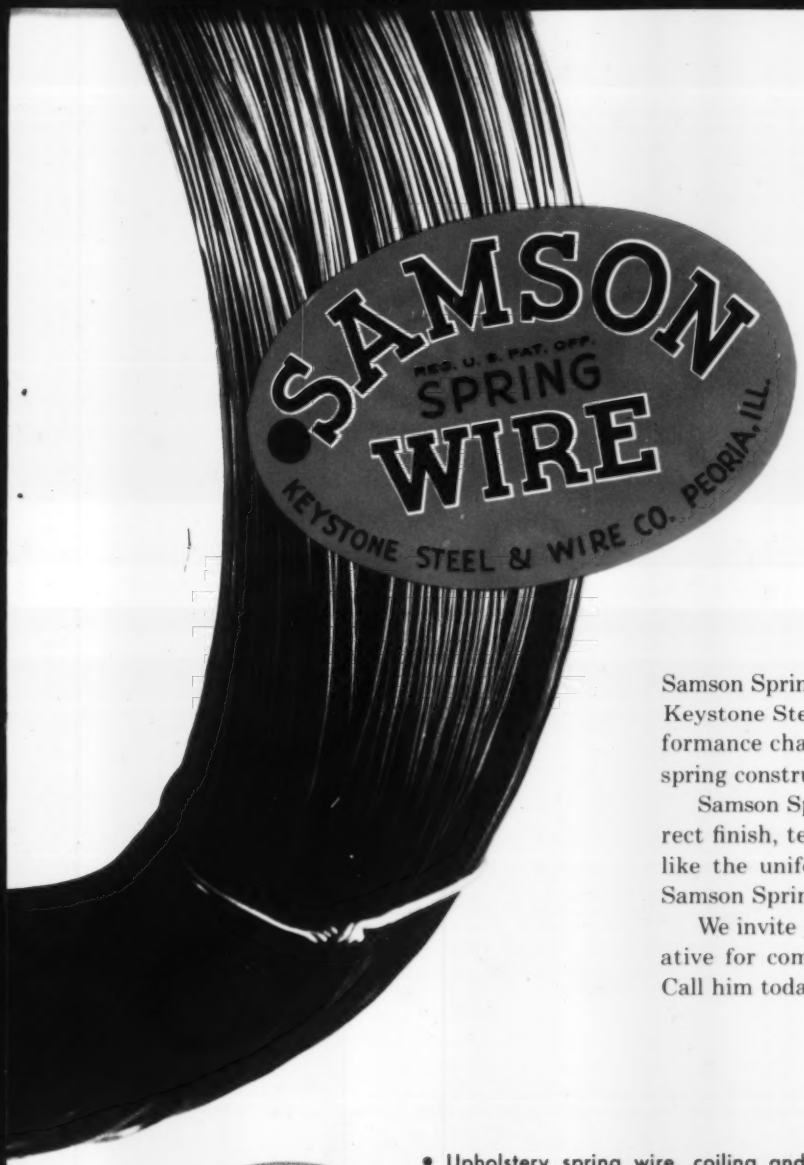
The savings during the first year amounted to $24,000 more than the cost of the machine—$13,000.

Here's Coremakers' Aid

Coremakers can now reinforce intricate cores with wires that break up during shakeout. They're made from a resin impregnated fiber glass called Pitt-Cor by Pittsburgh Plate Glass Co., Pittsburgh.

Wire sorting, reclaiming, and reforming time is saved. It's easy to handle during coremaking. The core will not crack away from the reinforcement. Its coefficient of expansion is equal to core sand.

There is no deformation after curing. If exposed to the metal in pouring, the wire won't adhere to the casting. Pitt-Cor is adaptable to all methods of baking.



. . . meets every spring construction requirement

Samson Spring Wire—an up-to-the-minute product of Keystone Steel & Wire Company, with modern performance characteristics—is available to fulfill every spring construction.

Samson Spring Wire is custom made with the correct finish, temper and tensile to fit each use. Users like the uniform size and coiling characteristics of Samson Spring Wire.

We invite you to contact your Keystone representative for complete details on Samson Spring Wire. Call him today—or write direct.

name your need . . .

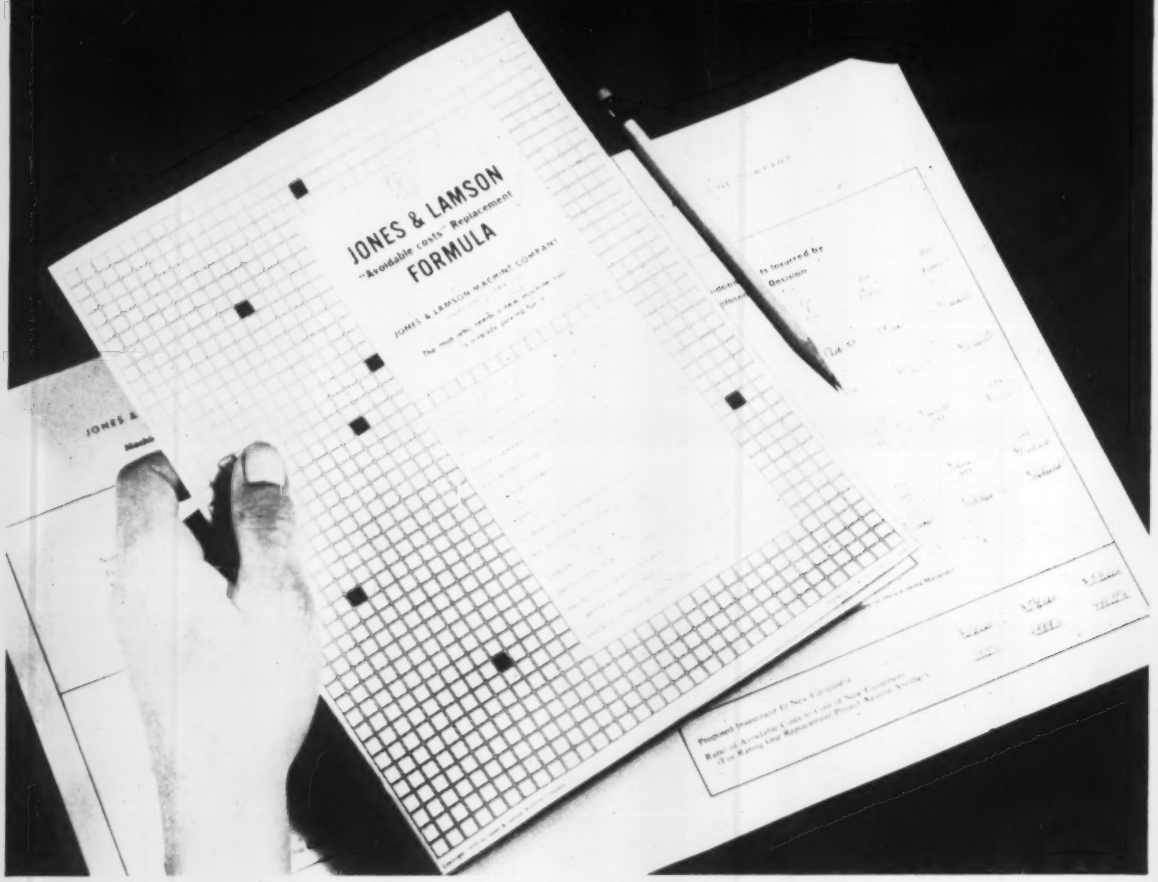
- Upholstery spring wire, coiling and knotting quality
- Upholstery spring wire for marshall pack units
- Special upholstery spring wire for use in automatic coiling and knotting machines
- Common lacing wire
- Special automatic lacing wire
- Spring wire for cross helical springs and for short tension springs
- High carbon wire for borders and braces
- High carbon wire for cold rolling into border and brace sections
- Wire for severe crimping or clinching upholstery spring construction

Keystone Steel & Wire Company
Peoria 7, Illinois

KEYSTONE
WIRE FOR INDUSTRY

JONES & LAMSON MACHINE COMPANY

the man who needs a new machine tool is already paying for it



How to get Equipment Dollars from Management

To management men, nothing speaks so eloquently as facts. Take the men in *your* front office, for instance. When told that a new machine tool (or several new ones) is a "must", they may very well be inclined to agree. But they have to be *shown*.

In order to sell management, you must present an accurate, factual statement, comparing current productivity of existing equipment, with the productivity attainable with new, advanced equipment.

And this is where you must exercise extreme caution.

Why?

Because, practically without exception, the formulas commonly used for evaluating machine tool performance contain flaws, fallacies and limitations which are seriously misleading. They give an erroneous picture because they distort the facts.

Happily, J & L has the answer to this problem. It's the new J & L "Avoidable Costs" Replacement Formula, which gives you an easy, step-by-step method of productivity evaluation which is logical, accurate and reliable. This formula is tried and true. It gives you a clear, true picture and supplies you with the facts you need in order to get that new machine you're looking for.

For your copy of J & L's "Avoidable Costs" Replacement Formula, together with easy-to-use work sheets, write Jones & Lamson Machine Company, 517 Clinton Street, Springfield, Vermont.

Turret Lathes • Automatic Lathes • Tape Controlled Machines • Thread & Form Grinders • Optical Comparators • Thread Tools

Case Hardening Improved With Induction Heater

A 50 kw induction heater is giving faster and higher quality case hardening at the FWD Corp., Clintonville, Wis. The heater hardens axleshaft bearing surfaces of heavy duty vehicles.

Operation: The part is positioned in machine V-blocks. This aligns the bearing surface to the work coil and the quench block.

With a lever mechanism, the operator raises the axleshaft into the work coil quench block. The heater is then turned on and the bearing surface is brought up to the right temperature and heat penetration.

Next, the oil quench block is energized, and the heated bearing surface is effectively quenched out. The shaft is lowered, turned 180 degrees, and the same cycle is repeated on the other side.

• **Equipment**—The complete worktable consists of a common quench sink with provisions for the use of either oil or water. The oil quench is controlled by an oil-to-water heat exchanger which is built in.

The unit is equipped with a Thyratron grid type power output control. A 0 to 100 per cent stepless control is provided. The machine is a high impedance output unit which feeds into a water cooled current transformer and multiple turn work coils.

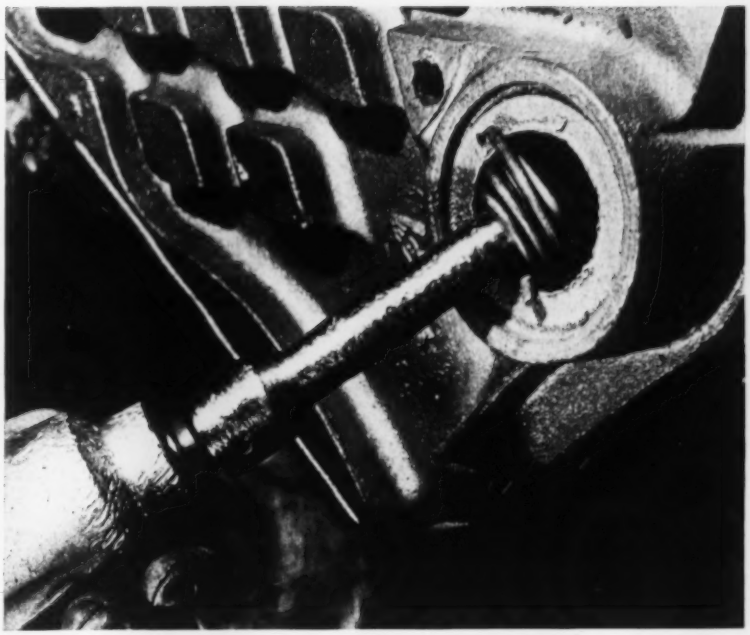
Allis-Chalmers Mfg. Co., Milwaukee, supplied the equipment.

Barrel Finishing Cuts Deburring Costs

A barrel finishing installation is saving $46,464 per year on deburring and finishing of clock parts for Westclox Div., General Time Corp., La Salle, Ill. The company is processing 24 different parts in ten machines made by Almco Div., Queen Stove Works Inc., Albert Lea, Minn.

Previously, power tools were used. Under these methods, only 3500 parts could be finished during an 8 hour shift.

With barrel finishing, a total of 10,000 cast gear wheels can be deburred and finished per hour. Daily labor saving is $193.60.



Tool Removes Stuck Wires, Saves Castings from Scrap

Secret is twisting action of air powered device. In 30 seconds, cores are clear. That's less than half the time consumed with old hand methods, study shows

AN AIR TOOL is saving time and eliminating scrap by removing stuck core wires from hollow castings at Forest City Foundries Co., Cleveland.

• **Job History**—Several men with pliers were assigned to remove wires after castings had been poured, cooled, and run through a shakeout. It took longer than a minute (70 seconds) to remove wire from a typical casting. Forest City found that whenever the reinforcing wire is close to the core surface, it tends to adhere or burn to the casting.

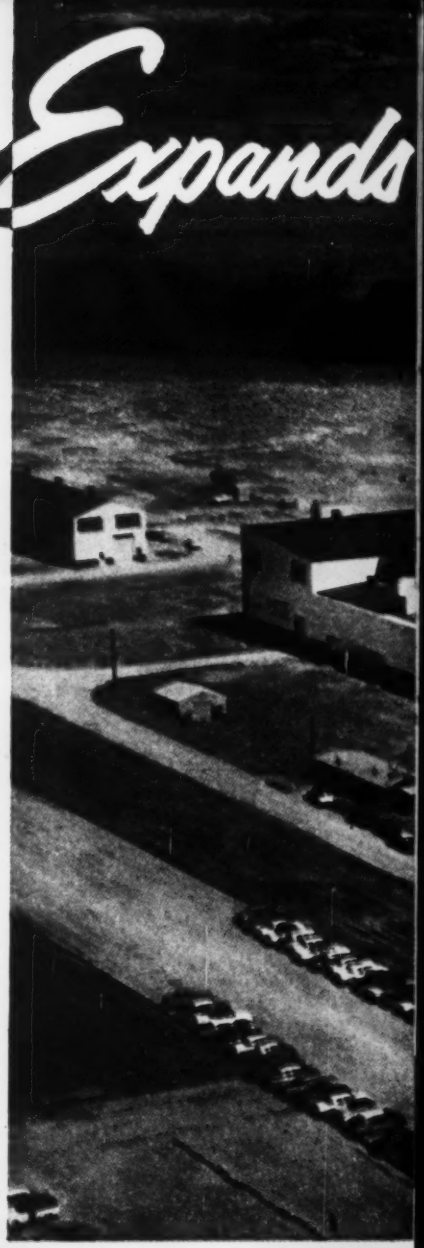
Burned wire can't be removed by pliers. It's brittle, and excessive tension will cause the wire to break rather than pull free. Those castings were rejected and set aside for salvage.

• **An Answer** — An air powered Impactool (made by Ingersoll-Rand, New York) provided a solution. It's used with an adapter that has a slotted end. The slot is placed over the exposed end of the core wire. When the tool is turned on, the wire is wound tightly around the adapter, freeing it from the casting wall. It then can be easily pulled out.

A survey was made to check the effectiveness of the operation. A group of castings with burned wires had been set aside for salvage. The tool removed every wire. A time study showed that hand methods required 70 seconds, the air powered unit only 30 seconds. Result: Double handling of castings with burned wires has been eliminated. Burned wires are now removed as easily as free wires.

UNIVERSAL-CYCLOPS STEEL *Expands*

. . . with a New Plant and New Cold Finishing Facilities at Coshocton, Ohio



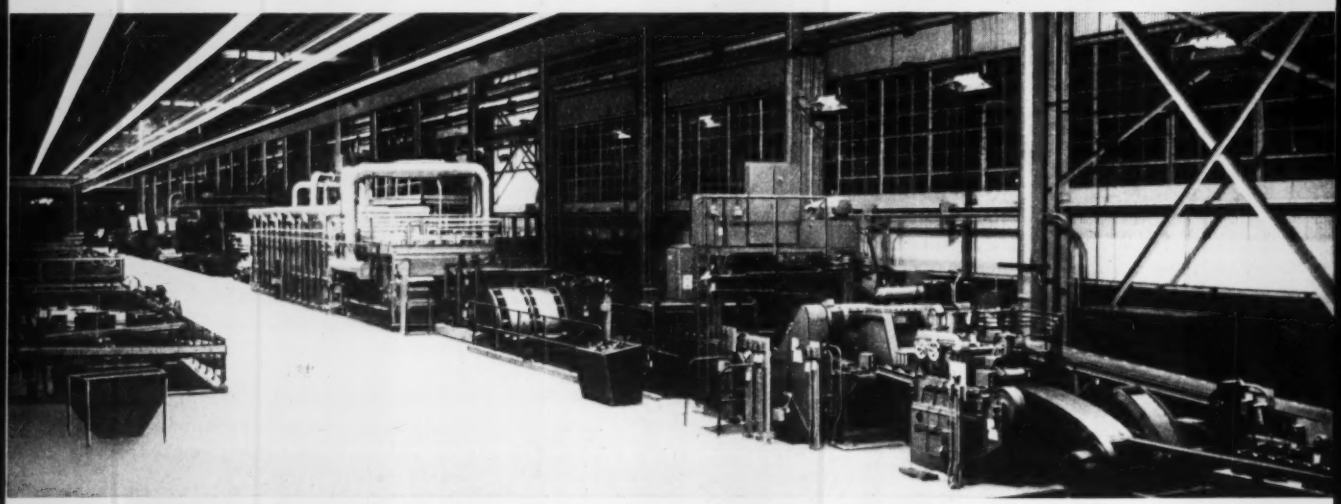
Universal-Cyclops, one of the leading producers of cold rolled stainless steel strip, announces the opening of a new plant at Coshocton, Ohio, which will supplement our facilities at Bridgeville, Pa., and greatly augment production capacity to meet the ever-increasing demands for UNILOY® Stainless Steel.

Completely new, this modern plant represents a major step in our corporate expansion program. It provides the finest facilities, production skills, engineering and metallurgical experience. It conforms to the policies maintained throughout our 75 year history, to constantly strive for highest quality standards in our products.

Customer oriented throughout, personnel and equipment are geared to meet the needs of our customers. Large stocks of finished coils are maintained at all times for prompt delivery.

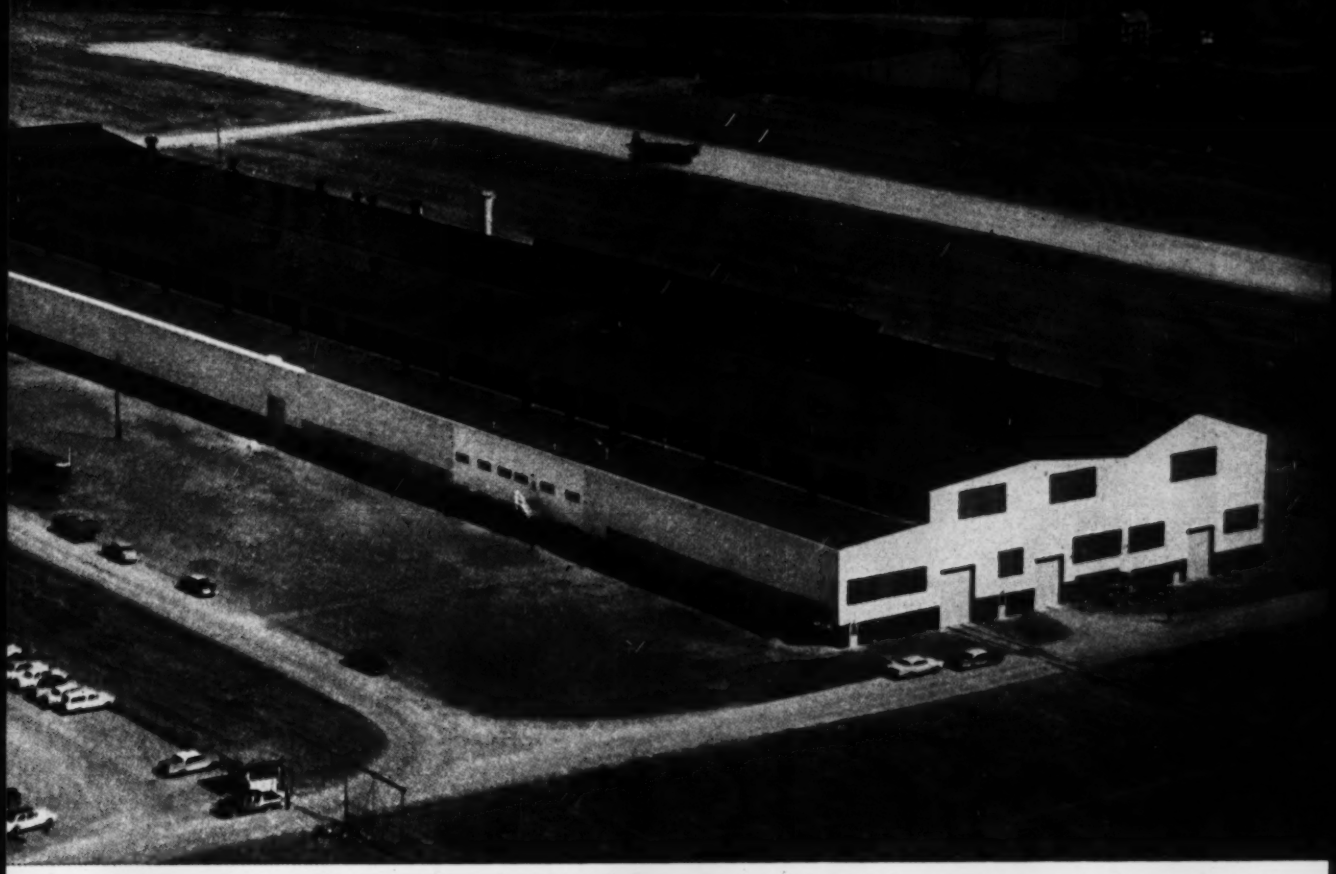
UNIVERSAL CYCLOPS
UC STEEL
STEEL CORPORATION
Bridgeville, Pa.

STAINLESS STEELS
TOOL STEELS · HIGH TEMPERATURE METALS



The most modern annealing and pickling line in the industry—over 600 ft. long. Handles two coils up to 24″ width.

Stainless Strip Capacity



Modern four-high cold rolling mill.

Temper mill provides top quality finish.

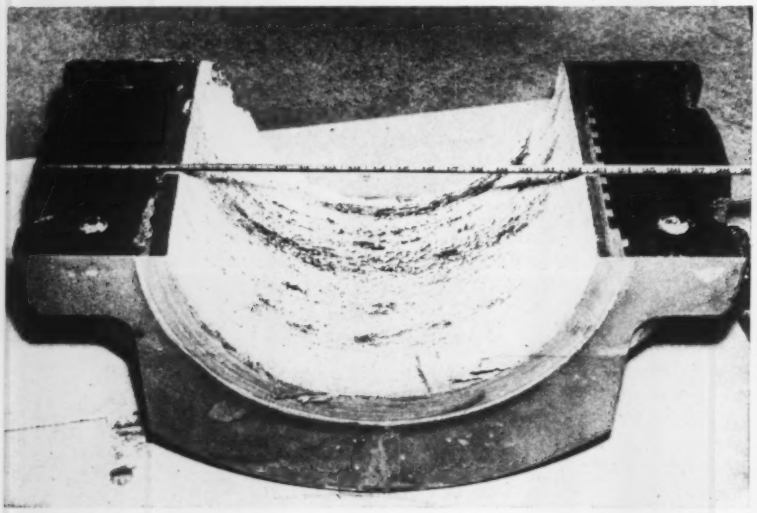
Large stocks of stainless steel coils—assure prompt delivery.

Bandsaws Boost Production Of Heavy Turbine Bearings

One piece casting saves time and reduces manufacturing costs by eliminating several foundry and machine shop operations; method requires minimum tooling

Big bearing is cast and babbitted in one piece, then cut apart with a bandsaw. Simple clamps hold the part in place on the worktable

Split turbine bearing is ready for milling of mating surfaces. Halves are bolted together, then turned and bored to finish dimensions



PAIRS of parts that fit together in a piece of equipment can often be cast and partially machined as a unit, then cut apart for final machining and installation.

Babbitted bearings for heavy turbines are made in one piece, then split with a bandsaw, at the Turbine Div., General Electric Co., Schenectady, N. Y. The band machine was supplied by the DoAll Co., Des Plaines, Ill.

• One piece casting cuts manufacturing costs by eliminating several operations in the foundry and machine shop.

The bearings are cast in one piece. And only one pattern is required, instead of two.

After the castings are rough machined, the outside diameter is turned and the inside diameter is bored. Flats for tiebolts are milled, and holes are drilled; the castings are then annealed for stress relief.

Bearings are babbitted by centrifugal casting. That eliminates some mold filling problems encountered in the previous method. Castings are split with a bandsaw, and mating surfaces are finish milled. Halves are bolted together, turned, and bored to finished dimensions.

Formerly, a typical bearing required 60 days' leadtime, from the foundry order to the finished part. Now it takes only 50. Savings in machining time have also been realized.

Tooling costs are reduced. Only one mold is needed for babbitting, and fewer milling machine fixtures are required. No special fixtures are needed for the sawing operation; work is held to the table with simple clamps.

• The band machine was made for the bearing splitting job, or for other heavy duty, straight line cutting applications.

The worktable, with a travel of 36 in., accommodates bearings up to 30 in. in diameter. The screw feed, driven by a hydraulic motor, offers maximum power, at all low speeds, for large cross sections or tough materials. For rapid traverse, the screw drive is disengaged, and the table is moved by a direct hydraulic feed system.

High speed steel saw bands, 1½ in. wide, cut at an average speed of 2.3 sq in. per minute.

• **Formerly, bearings were cast in two pieces; a complicated manufacturing process required repeated assembly of the parts.**

Bearings weighing up to 2 tons were originally made in two halves. The parts weren't identical; filler pieces were used to modify the pattern so it could be used to cast both halves.

Mating surfaces on the castings were rough milled. Bolt holes were drilled in one half and tapped in the other. Extreme accuracy was required in the layout and drilling.

Halves were then bolted together for rough machining of outside diameter and inside diameter. Insides had to be grooved to hold babbitt.

The bearings were then taken apart and annealed for stress relief, reassembled, babbitted, and broken apart. Excess babbitt was taken off; that had to be done with a large milling machine. Mating surfaces were finish milled, and the bearings were put together for final inside diameter machining on a boring mill.

Thermosetting Resin Ends Powdered Metal Porosity

A process using a thermosetting plastic resin can eliminate porosity in powdered metal parts, says National Sinter-Seal Co., Buffalo. This cost saving technique can be used where pressuretight sinterings are required.

The resin (called Sinter-Seal) is impregnated into the pores of the sintered metal part and cured under controlled temperatures.

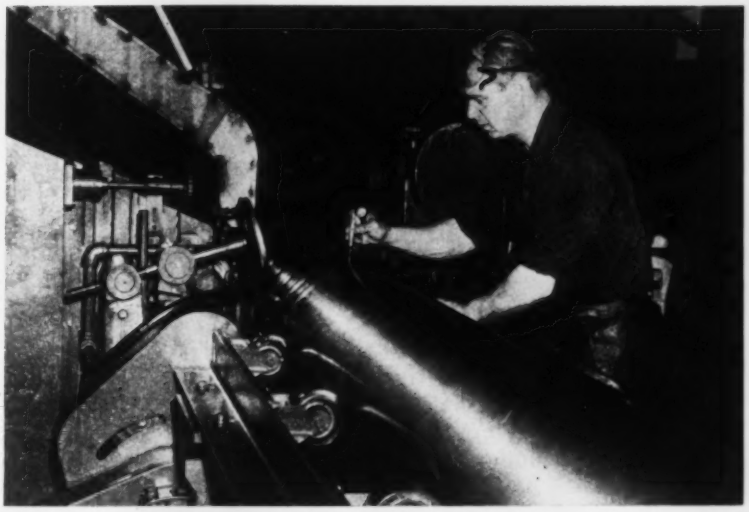
The plastic becomes inert and hard, making the part pressuretight and nonabsorbent.

The resin does not alter appearance or dimensions in any way and will withstand heat fluctuations up to 350 or 400° F.

Plating solutions, moisture, oil, and most solvents will not penetrate the cured resin; internal electrolytic or chemical corrosion and bacterial contamination are eliminated.

The design, size, or type of metal does not generally decrease the effectiveness of the process.

The company tests a representative sample of parts with each order and a full written report is issued.



Centerless Belt Grinding Meets Close Tolerances

Roundness is held within 0.002 and 0.003 in. on the tubular part, depending on diameter. Grinding is done with 40 grit and finished with 100 and 180 grit

A SURFACE FINISH of 16 to 32 microinches and almost perfect concentricity are obtained by centerless belt grinding a tubular steel part at Otis Elevator Co.'s San Francisco plant.

Stock removal is ½ lb per minute on some diameters. Abrasive cost: Less than 10 cents a pound.

The part is an elevator plunger that ranges 4 to 16 in. in diameter and reaches 56 ft in length. Wall thickness ranges 5/16 to ¾ in.

• **Grinding Procedure**—Mild steel pipe is descaled, high spots removed, and ground in a centerless grinder (Production Machine Co.'s Model 614). The work is fed to the coated abrasive belts at 65 fpm. The pipe is held to ±0.002 in. roundness on diameters through 6 in. and ±0.003 in. on the larger sizes.

Grinding is standardized with 40 grit, 6 x 168 in. aluminum oxide cloth belts with all-resin bonds. They run at 3500 sfpm. The contact wheel is 6 x 16 in. and has ¼ in. spiral serrations. Normally, stock removal on the diameter is 0.100 to 0.150 in. More than 100 lb of steel are removed from a 20 ft length of 12 in. pipe.

• **Finish**—Several passes are made with a 100 grit aluminum oxide belt, then one or two cleanup passes with 180 grit. The work is flooded with a sulfur chlorinated oil for better cutting performance.

The grinder has been modified to speed up production. Powered extension tables have been added to handle longer workpieces, and a cloth filter system (200 gpm capacity) keeps the coolant clean. An electrostatic precipitator has been added to the dust collecting system.

Fire precaution: A carbon dioxide bottle has tubing outlets in the grinding area and in the dust controller housing. It's controlled from the operator's console.

Behr-Manning Co., a division of Norton Co., Troy, N. Y., helped in determining the grinding process.

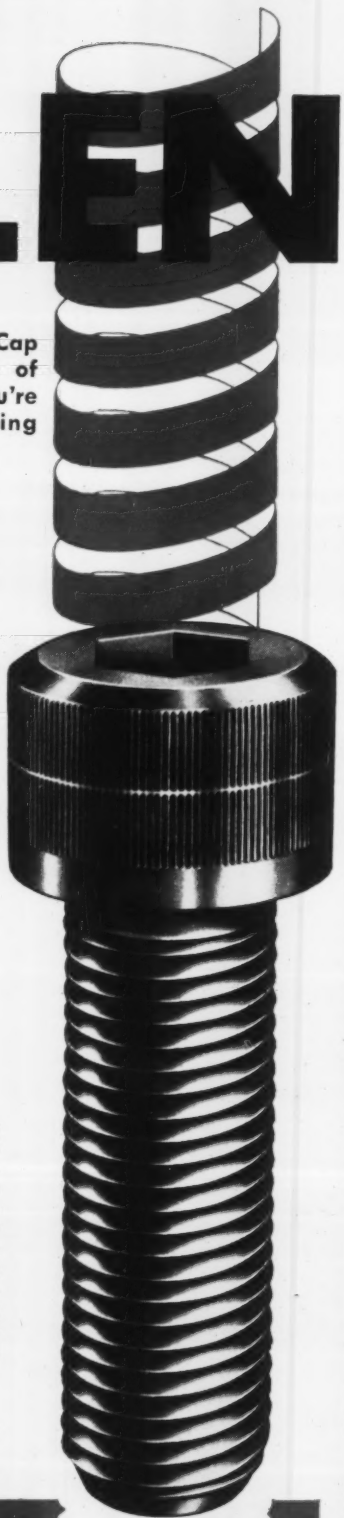
ALLEN

The cost of ALLEN Hex-Socket Cap Screws is only a minor fraction of your assembly costs . . . be sure you're getting the timesaving, cost-saving advantages of genuine Allens!

Ever since Allen first produced the hex socket head screw nearly fifty years ago, specifying *genuine* Allens (made by Allen of Hartford) has been a sure way to guarantee dependable threaded fastening.

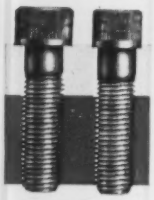
Only *genuine* Allens have Leader Points that make starting easier, and greatly minimize danger of cross threading. *Genuine* Allens are "pressur-formd" to preserve the long fibers uncut throughout the length of the screw, giving stronger sockets for greater tightening torque.

Write for samples and engineering data. See how *genuine* Allens will make your product better.



ALLEN HEX-SOCKET SCREWS HEAD

Allen's new 1960 Series Socket Head Cap Screws give up to 2⅓ times more load carrying capacity, without indentation. Head diameter of sizes from ¼" up is now uniformly 1½ times the body diameter—providing more under-the-head bearing surface, and a proportionate increase in clamping force. Write for new Bulletin G-25, with full specifications.



Stocked and sold by leading Industrial Distributors everywhere

ALLEN MANUFACTURING COMPANY
Hartford 1, Connecticut

Wire Inserts Hold Screws In Vibrating Equipment

Self-locking wire thread inserts are holding feeder units together at Cooper-Weymouth Inc., Stratford, Conn. The stainless steel inserts simplify assembly and disassembly and prevent accelerated thread wear.

Installation of the insert is the only step required beyond conventional drilling and tapping. The outside diameter of the insert is slightly larger than the inside diameter of the threaded hole in which it is installed. Spring tension retains the insert.

• **Case History**—In early models, constant vibration from presses tended to loosen the screws in the feeder unit, causing misalignment and inaccurate feed lengths.

Locking screws were tried, but during assembly, it was found that running the screws into deep holes greatly reduced the locking effect.

The problem was solved by a self-locking wire thread insert made by the Heli-Coil Corp., Danbury, Conn.

The locking coil is polygonal. As a bolt is run through the insert, the grip coil is forced to conform to the thread circle. The chord of the coil keeps strong, springlike pressure on the bolt. The locking effect is not impaired by repeated disassemblies.

Resin on Kraft Honeycomb Strengthens Metal Door

A door made by bonding honeycomb, resin-impregnated kraft material between two layers of steel resists shear tests up to 1575 lb without lamination failure, says Steelcraft Mfg. Co., Cincinnati.

The steel face bent before the adhesive or honeycomb failed. Both wet and dry honeycomb sections were tested. Results indicate that the reinforcement is many times stronger than other types.

During a slam test, a door was cycled 226,500 times with a force equal to about 30 lb. Rubber bumpers in the frame had to be replaced four times, but no exterior or interior damage was found.

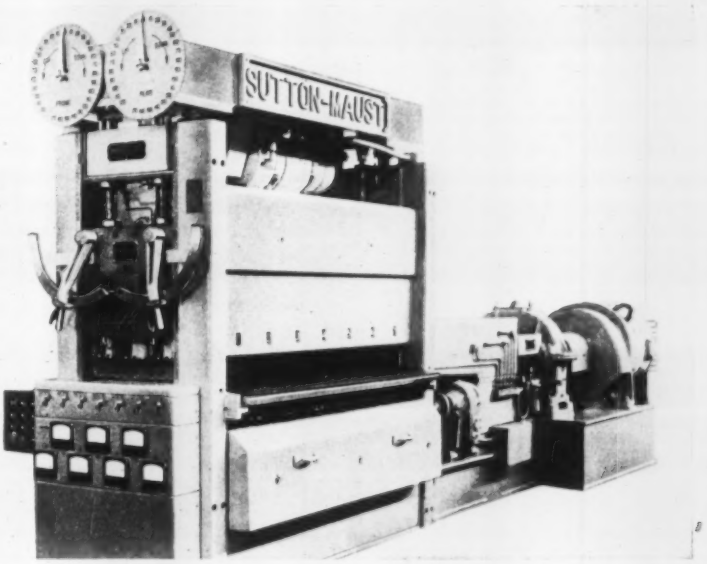
The units are sound resistant and available in a variety of types and sizes.

Roller Levelers Flatten, Correct Mill Shapes

PRECISION FLATTENING and correction of ferrous and nonferrous sheets and strip are assured with the Sutton-Maust line of roller levelers. Sizes are available for different widths and for thicknesses from 0.001 to 0.750 in.

The work rolls are cradled by multiple banks of adjustable backup rolls. The top work rolls are arranged in a symmetrical pattern with entry and exit rolls adjustable for upward tilt. The entry rolls subject material to gradually increasing waves. The centrally located roll group produces a series of uniformly deep waves for maximum correcting work and the exit group completes the process. Material flow may be reversed without adjustment. Burnish marks caused by severe entry conditions are eliminated. No pinch rolls are required.

Multiple banks of backup rolls are individually adjustable so that localized pressure can be exerted to any part of the sheet.

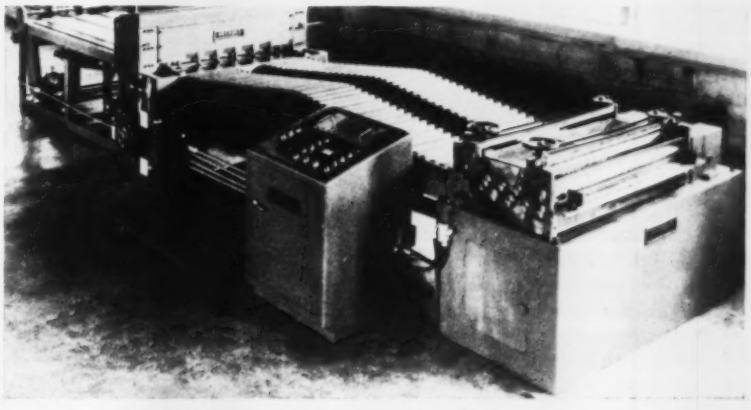


For more information, *write* Sutton Engineering Co., First National Bank Bldg., Pittsburgh 22, Pa.

Decoiling and Shearing Line Handles 6 ft Widths

AUTOMATIC DECOILING, straightening, and shearing can be done from a minimum length of 3 in. to any desired maximum with this line. Available in widths up to 6 ft, it can handle material up to 10 gage. It's designed for such metals as steel, stainless steel, and aluminum.

Available equipment includes straightening or leveling rolls, coil racks, coil lifts, edge trimmers, and scrap choppers. All units are wired into the console for electronic meas-



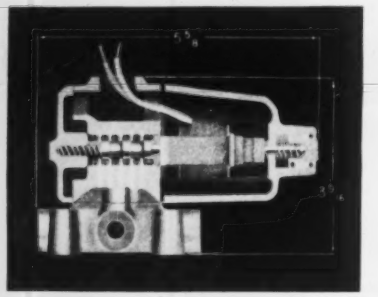
uring and control of the line.

For more information, *write* Secrest Machine Co., 1507 M St. N.W., Washington 5, D. C.

Small Valves Built for Automatic Assembly Unit

THESE diminutive, low cost air valves provide heavy duty performance and can be utilized in many places where bigger, more expensive valves are unnecessary.

Although designed for many applications, the small valves are particularly applicable to automatic assembly machines and packaging operations. They will operate cylinders having up to 4 in. bores in applications where high piston speeds are not a consideration.



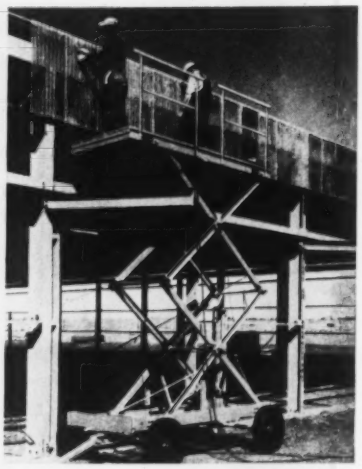
The Numatic SA Junior Air Valves are basically two valves: A single solenoid spring return four-way, and a double solenoid momentary contact four-way. The cutaway view reveals the lapped spool, the only moving part in the air valve, and the floating sleeve.

For more information, *write* Numatics Inc., Highland, Mich.

Elevating Scaffold Eases Plant Maintenance Jobs

FACTORY and plant maintenance work can be done more easily with the Sky Witch, a portable, hydraulic, elevating scaffold. It can lift loads up to 1 ton.

The unit can be equipped with gasoline or electric motors to power the hydraulic system. Air motors are optional. It is available on skids (for mounting on the user's con-



veyance), mounted on casters, pneumatic tired wheels, or trailers.

Raising and lowering of the scaffold is controlled from the platforms by a single lever. Platforms range in size from 2½ by 7½ ft to 5 by 24 ft to elevate to heights from 10 to 24 ft.

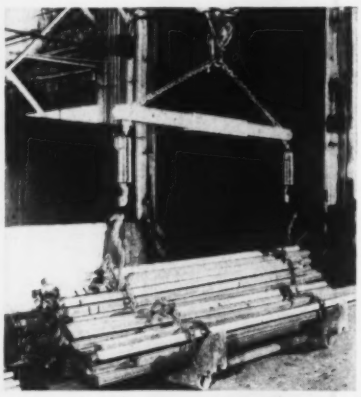
For more information, *write* Charles Machine Works Inc., 699 B St., Perry, Okla.

Solenoid Chain Release Provides Handling Safety

TOUGH-TO-HANDLE loads can be safety handled with the Acco solenoid chain release.

The unit is remotely controlled by the crane operator from his cab. By pressing a button, he activates the solenoids at each end of a spreader bar. This expels the chain from its hooks and releases the load.

Should the pushbutton be pressed accidentally, or the power fail while the load is being transported, the load will not be released. As a safety



factor, all loads must be on the floor and tension removed from the chain before the solenoids become operative.

For more information, *write* American Chain Div., American Chain & Cable Co. Inc., York, Pa.

Truck Mounted Charger Saves Time and Space

ELECTRIC truck batteries can be charged automatically with the Exide Power Mount which rides around on the battery.

The silicon-rectifier device, with a transistorized control unit, can be plugged into any 115 volt ac outlet to charge the battery right in the truck. No further attention or additional equipment is needed.

The charger automatically and precisely maintains the proper charge rate from the beginning of the cycle. It keeps batteries performing at peak capabilities, assures longer life, and minimizes maintenance.

For more information, *write* Exide Industrial Div., Electric Storage Battery Co., 42 S. 15th St., Philadelphia 2, Pa.

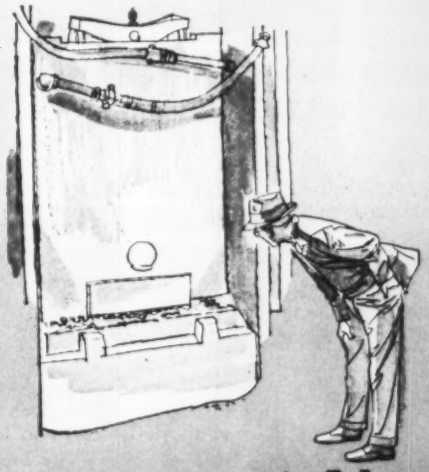
Floor Machine Cleans 15,000 sq ft an Hour

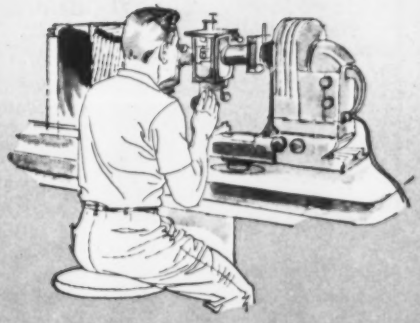
DESIGNED for buildings with large, open areas, the Convertamatic floor machine enables one man to perform a complete floor maintenance job.

On each pass, as it propels itself

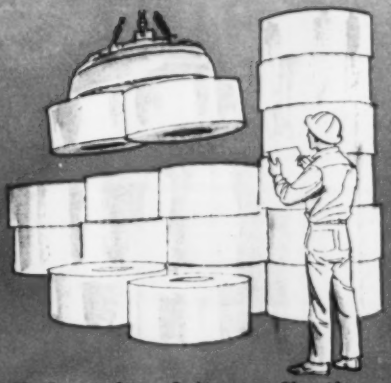
METALLURGY

is a SPECIAL service





at Alan Wood



Practiced as a true science at Alan Wood, METALLURGY controls production . . . to the advantage of all customers. Your Alan Wood Representative understands these advantages and how they can increase your product's quality. For example, he may suggest a metallurgical study of your situation. He has complete information on cold rolled steel and its applications, and his advice on type, gauge and size to order can help you eliminate production problems . . . cut costs . . . increase profits.

Call your Alan Wood Representative today! He's always available . . . and ready to help.

ALAN WOOD STEEL COMPANY

CONSHOHOCKEN • PENNSYLVANIA

DISTRICT OFFICES AND REPRESENTATIVES:
Philadelphia • New York • Los Angeles • Atlanta • Boston • Buffalo • Cincinnati • Cleveland
Detroit • Houston • Pittsburgh • Richmond • St. Paul • San Francisco • Seattle
Montreal, Toronto and Vancouver, Canada—A. C. Leslie & Co., Limited

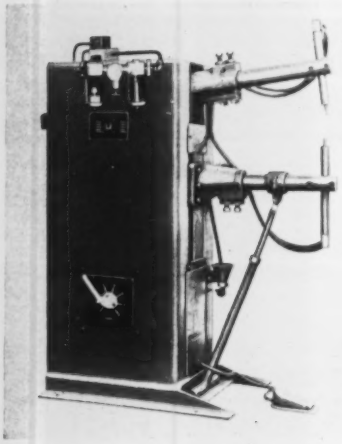
over the floor, the machine lays a cleaning solution, scrubs a 24 in. swath, vacuums up the dirty solution, and dries the floor—all in one operation. The machine can be used for combination polishing and dry vacuuming.

For more information, *write* Advance Floor Machine Co., 4100 Washington Ave., Minneapolis, Minn.

Resistance Welders Simplified, Improved

EASIER operation, maintenance, and a broadened work range have been built into a line of single phase resistance welders. Precision, economy, and flexibility are improved in the simplified units. The air actuated and foot operated models have kva ratings from 10 to 75, and throat depths from 12 to 36 in.

The timing sequence and heat



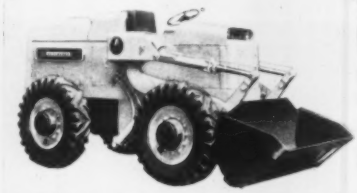
adjustments provide for high speed, resistance welding of all types of weldable metals.

Nylon trunnion bushings are used to eliminate oiling. Contact switches don't require adjustment due to setup changes.

For more information, *write* Universal Electroweld Div., Electric Arc Inc., 152-1 Jelliff Ave., Newark 8, N. J.

Tractor Shovel Has More Hydraulic, Tractive Power

FEATURES of this four wheel drive, rubber tired, tractor shovel (Model H-50) include more power in hydraulics and traction, more efficient torque converter, complete power shift transmission, power transfer differentials, power steering, pry-out bucket action, safety boom arms, power boosted brakes, and other refinements.



Replacing the Model HU Payloader in this company's line, the new tractor has more powerful gasoline and diesel engines which provide from 90 to 92 hp.

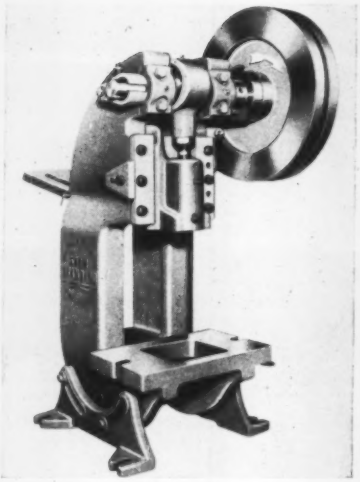
The Paylomatic power shift transmission provides three speeds in each direction. Fingertip shifting up or down in either directon, without foot clutching or stopping for a range shift, gives fast operating cycles.

For more information, *write* Frank G. Hough Co., 876 Seventh Ave., Libertyville, Ill.

Improved OBI Press Designed for Economy

HERE'S a press that develops 5 full tons, yet meets economy requirements. Standard stroke is 1 in. with a 7½ in. shut height, but 1¼, 1½, and 2 in. strokes are also available.

The ram has a 1 in. adjustment and is equipped with a 1 in. hole



for tooling. Center of slide to frame is 4 in. The bed area is 6¼ x 10 in.

The single trip clutch mechanism is retained. The ram can be made to run continuously by removing one bolt. Gibs on the slide are adjustable and play can be removed with a single take-up bolt. An adjustable crankshaft brake is standard.

The Series 40 presses operate at 280 to 290 strokes per minute. They're powered with a 1725 rpm, ⅓ hp motor.

For more information, *write* Benchmaster Mfg. Co., Gardena, Calif.

Thread Rolling Machine Can Be Easily Adjusted

HERE'S a small range unit that is capable of handling diameters up to 2 in. (eight threads per in. or finer) with infeed rolling and up to ¾ in. (ten threads per in. or finer) when using the throughfeed method.

The unit is pneumatically or hydraulically operated. Major components which require adjustment or setting are conveniently located.

Spindle speeds are adjustable from 166 to 500 rpm through pulleys. The speed range allows each diameter to be roll threaded at the most efficient speed.

Two cylindrical thread roll dies are mounted on inclinable roll holders adjustable to 10 degrees left or right hand. This inclination handles all AN, UN, and Acme thread

TV cameras, transmitters and receivers, punched card programming, electronic brains . . . Inland's new 46" Universal automatic slabbing mill is a far cry from the mills of yesteryear. At his fingertips, today's mill operator—Inland Slabber . . . 1959—has power and precision control never before achieved. Currently fed from six soaking pit batteries, this giant, new slabbing mill operates at a capacity of 1,800,000 tons per year. As primary and finishing capacity grows in response to Inland's continuous plan for expansion, this mill, built with an eye to future requirements, can draw upon more than three times as many soaking pits—step-up its capacity to a tremendous 4,000,000 tons. For soaring mid-western industry, this means an always dependable source—producing more uniform steel of highest metallurgical quality, at ever-increasing speed.

Building Today, With an Eye to Tomorrow

INLAND SLABBER . . . 1959

INLAND STEEL COMPANY
30 West Monroe Street • Chicago 3, Illinois
Sales Offices: Chicago • Davenport • Detroit • Houston • Indianapolis
Kansas City • Milwaukee • New York • St. Louis • St. Paul

Other Members of the Inland Family
JOSEPH T. RYERSON & SON, INC.
INLAND STEEL PRODUCTS COMPANY
INLAND STEEL CONTAINER COMPANY*
INLAND LIME & STONE COMPANY* *Division

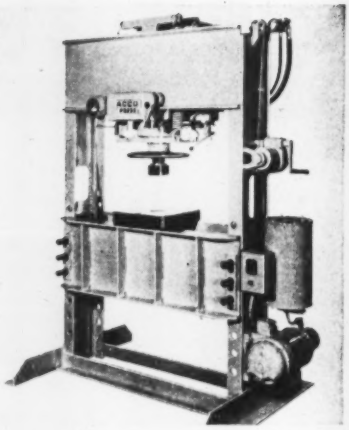
forms within the machine's capacity.

When using the infeed method of rolling, the right hand movable die is advanced and withdrawn by a pneumatically operated toggle system capable of 60 cycles per minute. High rolling pressures are obtained with minimum deflection and stress and maximum thermal stability.

Tooling is simple and versatile, with standard interchangeable components for infeed or throughfeed rolling.

For more information, *write* Landis Machine Co., Waynesboro, Pa.

Electric Hydraulic Press Available in Two Models

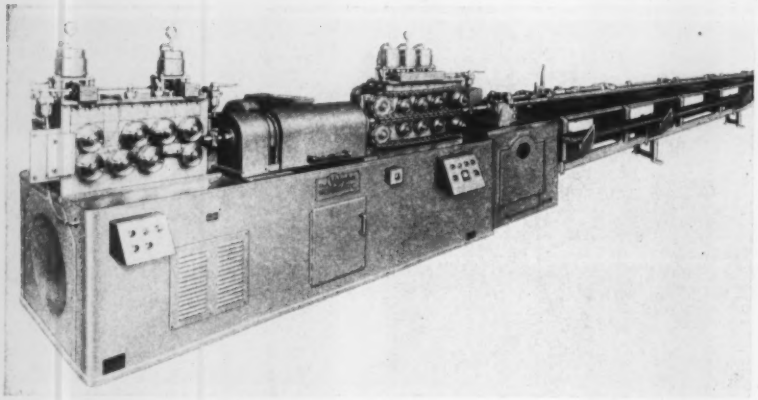


THIS MOTORIZED unit can develop pressures hydraulically up to 150 tons. Two versions are available. Model MPH-150-E22 uses a 2 hp motor and has a ram speed of 4.2 in. per minute at no load and 2 in. per minute at full load. Model MPH-150-E55 is equipped with a 5 hp motor and has a ram speed of 11 in. per minute at no load and 7.5 in. per minute at full load.

Each unit has 8 in. ram travel, 8 in. screw travel, 24 in. table travel, 19⅜ in. horizontal head travel, and a 29½ in. maximum from ram to table. Width between uprights is 48 in.

A motor and radial piston pump, mounted as an integral unit on an adapter provides operating pressure. Control is furnished by a three position valve that automatically returns to neutral from ram advance or retract position. If the control lever is released during operation, it automatically returns to neutral and prevents further ram travel.

For more information, *write* American Chain & Cable Co. Inc., 929 Connecticut Ave., Bridgeport 2, Conn.



Machine Straightens and Cuts Wire

SAVINGS in material and labor costs are claimed for the Vaughn Motomatic No. 75 machine which straightens and cuts wire from coils.

The machine uses the caterpillar chain feed technique which provides positive feed, eliminates twist, and speeds the coils through the machine. It includes a simplified flying shear cutoff synchronized with the wire feed. Variable speeds can be obtained through a direct current motor or alternating current variable speed unit, controlled by a single lever.

The machine provides fast, efficient delivery of straight, precision-cut wire of uniform diameter and length at speeds up to 300 feet per minute.

Designed to handle a wide range of wire sizes, the Motomatic is equipped with an adjustable-center straightener arbor which permits increasing the size range of the machine up to 50 per cent. It is a self-contained, compact unit, furnished with all electrical and mechanical parts, including a quick loading safety reel and an extension and runout table of fabricated steel.

For more information, *write* Vaughn Machinery Co., Cuyahoga Falls, Ohio.

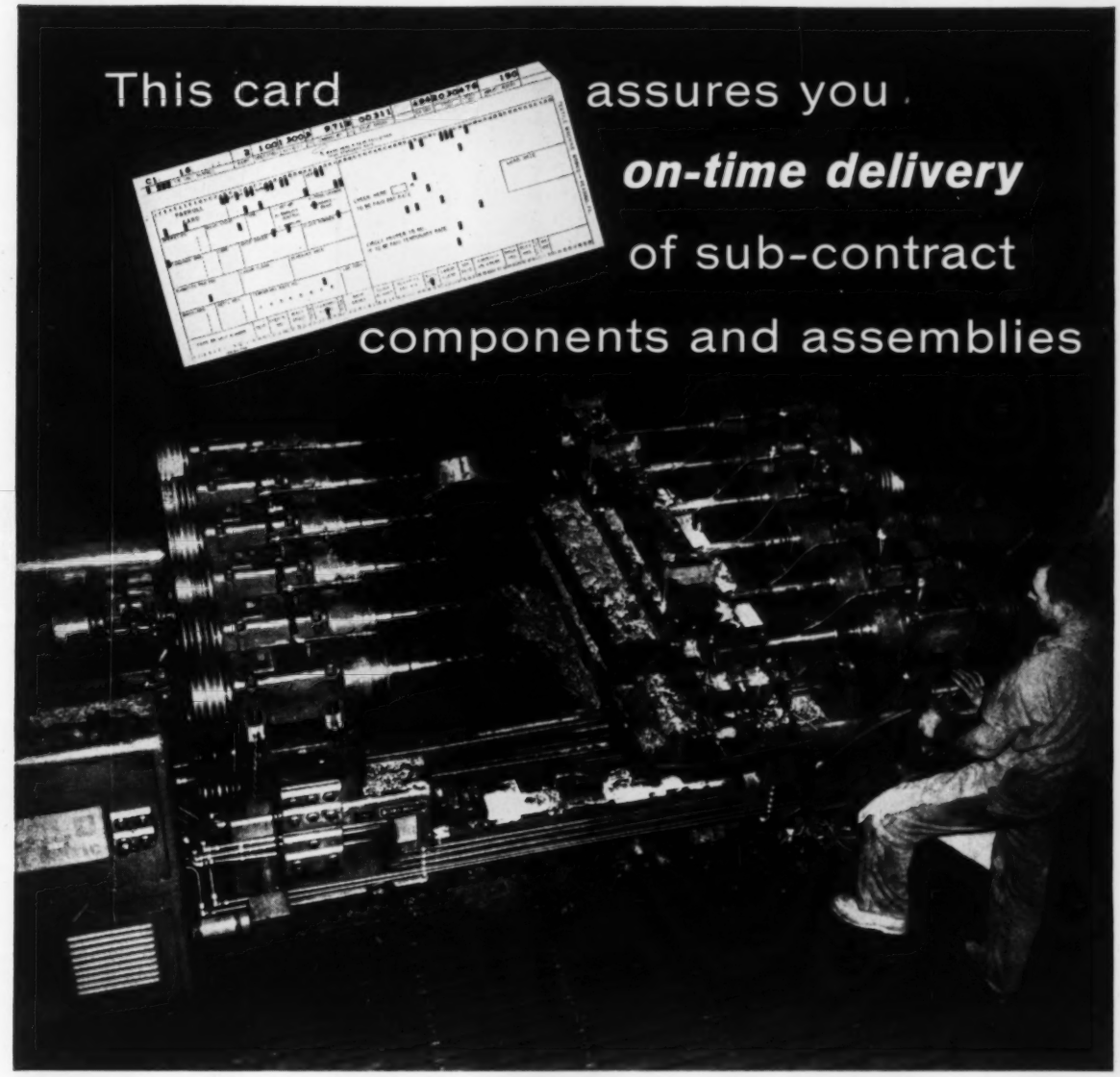
Electrolytic Metal Cleaner

HERE is a line of electrolytic cleaners for removing intentional soils from aluminum and its alloys, zinc, steel, brass, copper, and nickel.

The high alkalinity of the Detrex cleaners gives maximum saponification when not preceded by other cleaning methods. The soil carrying capacity as well as solution stability have been increased. This prevents the redeposition of soils and insolubles on the freshly cleaned surfaces, and makes for easy rinsing.

The cleaners are recommended for batch type plating shop applications. They eliminate heavy foam buildup. The light form is fast breaking, and reduces the possibility of hydrogen explosions.

For more information, *write* Detrex Chemical Industries Inc., Box 501, Detroit 32, Mich.



It's a small but important part of TMW's electronic punched card scheduling and control system. And it's your assurance that sub-contract jobs, regardless of size or quantity, are delivered *on time*.

You get this when you work with one of the world's largest, most modern and completely integrated manufacturers, whose 65 years' experience in precision (tolerance to 10ths) manufacturing is available to you *now* on either a short or long term basis.

Textile Machine facilities include 1200 modern machine tools of all types and sizes, a completely mechanized foundry (one of the country's largest), 3000 skilled craftsmen, plus a corps of the industry's top designers and engineers.

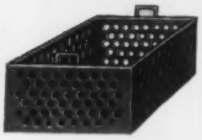
Combine these facilities with modern electronic production scheduling controls and quality control techniques . . . and you've got the perfect answer to all your sub-contract problems.

Write today for more detailed information, or for a copy of our latest Facilities File Folder.

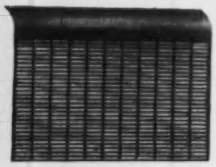
TEXTILE MACHINE WORKS

Contract Division • Reading, Pennsylvania

Perforated Metal Products and Parts



Pickling Basket



Air Inlet Screen for Oil Burner

We, of course, supply manufacturers with perforated metal sheets and plates in a wide variety of sizes and shapes, from which they produce their own products and parts, but we are also fully equipped to relieve them of a great deal of this work. We weld, spot-weld, or rivet, stiffeners and angles to the pieces and can form or flange them to special shapes as required. The items here shown are typical of hundreds we have furnished to other manufacturers during nearly a half century of successful experience.

Perforated Metal, spot-welded to specially formed angles.

YOU'LL SAVE MONEY in most cases, by placing orders with us for perforated metal parts, to be delivered in lots throughout the year in accordance with your production schedules. Specialized equipment and procedures will usually enable us to do the work at lower cost than it could be done in your own shops. Send us your blue prints and specifications. When given sufficient information, our engineers are often able to make money-saving suggestions and always welcome an opportunity to do so.

DIAMOND MANUFACTURING CO., WYOMING (Wilkes-Barre Area) **PENNA.**

New Bulletin No. 51, Describes DIAMONTEX Perforated Metal Lay-in Panels for Modern Acoustical Ceilings.

PRECISION GRINDING

Since 1944

Steel Mill • Rubber Paint • Ink • Banbury Calender Rolls

Investigate Universal's prompt, economical service for your largest roll grinding needs.

22" x 240" Roll Grinder with Superfinish

GRINDING SPECIALISTS

Centerless • Internal
External • Surface
Hyprolap • Blanchard

Contract grinding for millright service or parts finishing. Universal offers you one-source service covering *all* types of grinding with sufficient machines of each class to assure prompt service and low cost.

Telephone today and see (MAin 1-4363)

UGC **UNIVERSAL GRINDING CORP.**

2200 Scranton Road, Cleveland 13, Ohio

NEW literature

Write directly to the company for a copy

Refractory Aluminas

Properties, characteristics, and uses for the various types of aluminas are given in a 16 page brochure. Kaiser Aluminum & Chemical Corp., 1924 Broadway, Oakland, Calif.

Threading Lathe Catalog

A new catalog covers the Gisholt Cri-Dan Model "B," high speed, semiautomatic, single point, threading lathe. Gisholt Machine Co., Madison 10, Wis.

Aluminum Machining Chart

A chart provides tables of recommended speeds and feeds for forming, turning, drilling, boring, reaming, and cutoff. Peter A. Frasse & Co. Inc., 17 Grand St., New York 13, N. Y.

Turret Drilling

A catalog explains the Brown & Sharpe turret drilling technique. A six-spindle machine can be used for drilling, tapping, boring, or reaming. It can be indexed in any sequence. Brown & Sharpe Turret Drilling Div. Inc., 20 Fitch St., East Norwalk, Conn.

Floodlight Catalog

Bulletin 2714, 184 pages, gives information on the selection, application, and installation of floodlights and accessories. Crouse-Hinds Co., Syracuse 1, N. Y.

Welding Electrode Data Chart

A quick reference chart lists 25 items of comparative information on more than 130 of the most commonly used electrodes. National Cylinder Gas Div., Chemetron Corp., 840 N. Michigan Ave., Chicago 11, Ill.

Indexing Tables

Engineering drawings of cam operated indexing units, Models ST-A9B, ST-A9C, and ST-A9D are included in a bulletin. Standard Tool & Mfg. Co., 237 Laurel Ave., Kearny, N. J.

New Uses for Pipe

A 10 page guide shows how many industrial fixtures can be quickly constructed from ordinary pipe by using a simple universal clamp. Tube-Strut Corp., 2960 Marsh St., Los Angeles 39, Calif.

Adjustable Speed Drives

Bulletin GEA-6806 describes the new ¼ to 25 horsepower line of Polydyne mechanical, adjustable speed drives. General Electric Co., Schenectady 5, N. Y.

Gear Motor Catalog

A 32 page bulletin, 117, contains technical information on horizontal and vertical mounted gear motors. Hewitt-Robins Inc., 666 Glenbrook Rd., Stamford, Conn.

SOLVING PROBLEMS COMES EASY

WITH SAGINAW b/b SCREWS!

SOLVED EXCESSIVE POWER CONSUMPTION

SOLVED SPACE/WEIGHT PROBLEMS

SOLVED PRECISE POSITIONING

SOLVED TEMPERATURE EXTREMES

SOLVED LUBRICATION

SOLVED DEPENDABILITY

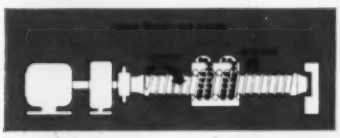
THE MINIATURE b/b SCREW

Used where *miniature* positioning/control precision and dependability is essential in telemetering and guidance systems, antenna coupler tuning, and similar diminutive actuating applications.

THE SAGINAW b/b SCREW

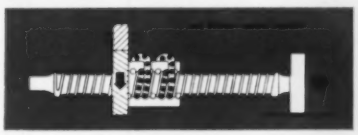
Used in afterburner controls, elevon positioners, as speed brake actuators, in clamping mechanisms for missile boosters, and many other applications.

ACTUATE AND POSITION WITH OVER 90% EFFICIENCY . . . 4/5 LESS TORQUE!



NUT TRAVELS: When rotary motion is applied to the screw, the b/b nut glides along the axis of the screw on rolling steel balls, converting rotary force and motion to linear force and motion with 4/5 less torque than acme screws.

SCREW TRAVELS: When rotary motion is applied to the b/b nut, the screw glides along its longitudinal axis on rolling steel balls, converting rotary force and motion to linear force and motion with unprecedented efficiency.



1 **SAVES POWER.** Operates with almost 100% efficiency. Saginaw b/b Screws permit much smaller motors with far less drain on electrical systems, also simplify circuitry.

2 **BROAD TEMPERATURE TOLERANCES.** Normal operating temperature for Saginaw b/b Screws is from −75°F. to +275°F. In selected materials they will function efficiently at temperatures as high as +900°F.

3 **SPACE/WEIGHT SAVINGS.** Saginaw b/b Screws are compact. They permit smaller, lighter motors and gear boxes and eliminate cumbersome auxiliary equipment.

4 **NO LUBRICATION NEEDED.** If lubrication fails, the Saginaw b/b Screw will still function with remarkable efficiency. Units have been built and qualified for operation without lubrication.

5 **POSITIONS PRECISELY.** Saginaw b/b Screws will position components far more precisely than hydraulics or pneumatics; tolerances on position are held within .0005 in./ft. of travel.

6 **DEPENDABLE PERFORMANCE.** Saginaw b/b Screws are far more reliable than hydraulics or pneumatics. Gothic-arch grooves, yoke deflectors and multiple circuits provide added assurance.

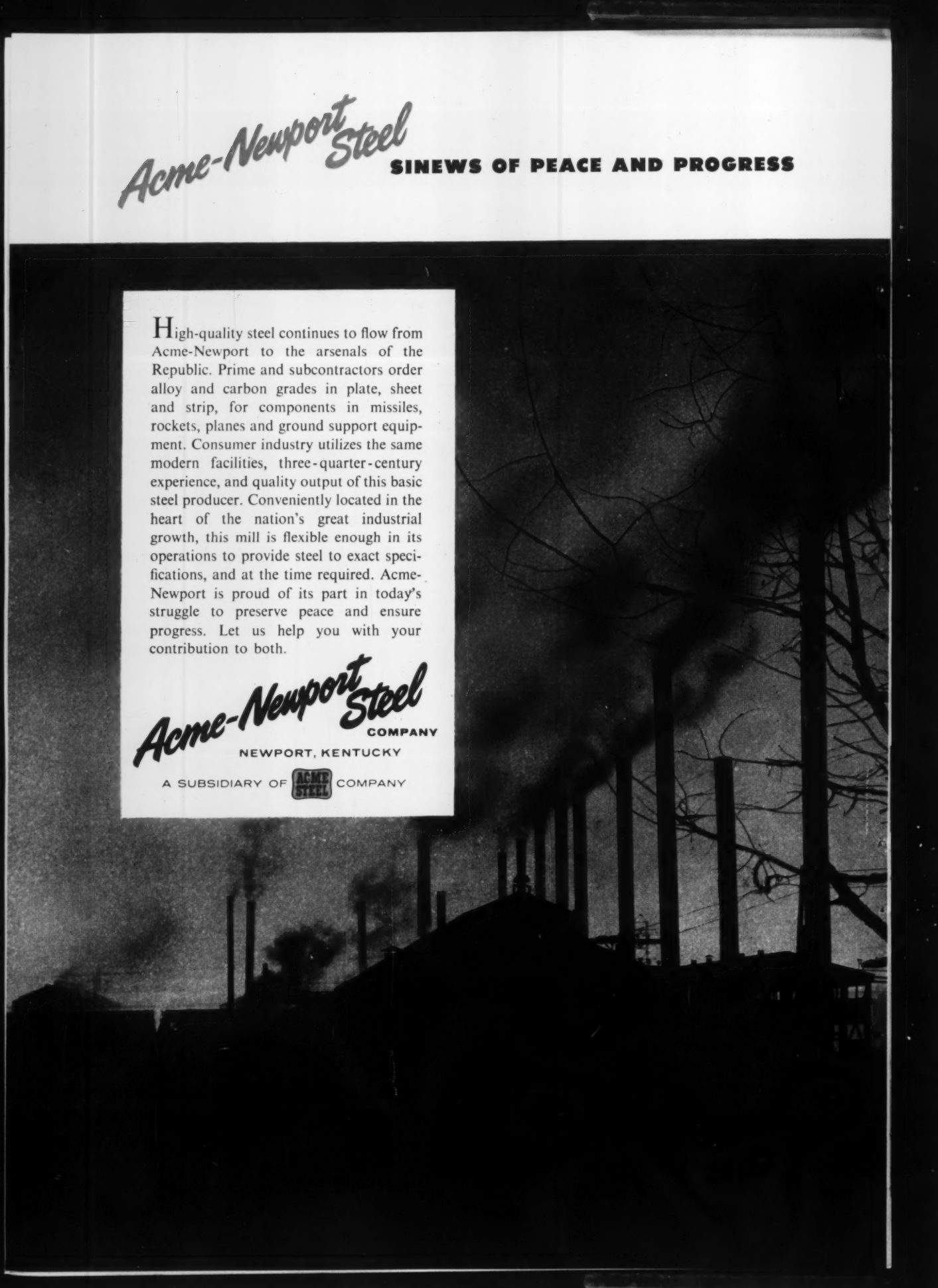
SEND TODAY FOR FREE 1959 ENGINEERING DATA BOOK . . .
or see our section in Sweet's Product Design File

Available in custom machine-ground and stock rolled-thread types. Units have been built from 1½ inches to 39½ feet long—3/16 to 10 inches in diameter.

Saginaw ball bearing Screws and Splines

SAGINAW STEERING GEAR DIVISION OF GENERAL MOTORS • SAGINAW, MICHIGAN

WORLD'S LARGEST PRODUCER OF BALL BEARING SCREWS AND SPLINES


Acme-Newport Steel
SINEWS OF PEACE AND PROGRESS
High-quality steel continues to flow from Acme-Newport to the arsenals of the Republic. Prime and subcontractors order alloy and carbon grades in plate, sheet and strip, for components in missiles, rockets, planes and ground support equipment. Consumer industry utilizes the same modern facilities, three-quarter-century experience, and quality output of this basic steel producer. Conveniently located in the heart of the nation's great industrial growth, this mill is flexible enough in its operations to provide steel to exact specifications, and at the time required. Acme-Newport is proud of its part in today's struggle to preserve peace and ensure progress. Let us help you with your contribution to both.
Acme-Newport Steel
COMPANY
NEWPORT, KENTUCKY
A SUBSIDIARY OF ACME STEEL COMPANY

August 17, 1959

Steel Stocks Adequate for Next Seven Weeks

STEEL INVENTORIES are falling at the rate of 1 million tons a week but they'll sustain production schedules in most metalworking plants until early October, a reassessment shows.

When the strike began, almost five weeks ago, users' stocks were at an all-time high of 26 million tons. Steel company market analysts cite these factors:

On Jan. 1, the inventory level was about 16 million tons—3 million higher than originally estimated (1958 consumption was overstated).

During the first six months of the year, steelmaking operations far surpassed expectations. The economic upturn released a flood of orders, and product mix permitted record output (domestic shipments of 46.8 million tons).

Finished steel imports jumped to 1.9 million tons, more than doubling year-ago figures.

First half consumption was only 39 million tons, or 9.7 million less than combined domestic shipments and imports. Stockpiles jumped from January's 16 million to 25.7 million on June 30. By July 15 they were at the highest level in history: More than 26 million tons.

STRIKE'S IMPACT— Since the start of the strike, consumers have been getting about 500,000 tons a week from these sources: 250,000 from mills that are still operating; 150,000 from service centers; 100,000 from foreign producers. They've been using steel at a weekly rate of 1.5 million tons, so consumption has exceeded receipts by 1 million tons a week. With almost five weeks of the strike behind them, users have cut their inventories (including material available from service centers) down to 21 million tons. But since a supply of 14 million tons would probably meet minimum working requirements, it's clear that today's inventory has a seven week surplus. Barring imbalances or a sudden upturn in consumption, it should suffice until Oct. 7.

SIGNS OF UNREST— Silent telephones and uncluttered desks in steel company sales offices testify that most consumers have ample inventories, but there are scattered signs of unrest. Stockpiles in the automotive and appliance industries may last until October, but even now some of the leading companies are starting to check on their supplies. If the strike lasts until Sept. 1, automakers will be worried about December stampings and January assemblies. Small users are likely to run out of metal first, but there are exceptions. Case in point: A. O. Smith Corp., Milwaukee, said it would shut down its pipe mill Aug. 15 if the strike wasn't settled promptly.

SHIPPING DELAYS FORESEEN— Order backlogs are so large that some mills are refusing to open their books for the fourth quarter. If the strike ended Sept. 1, they would have only December in which to sell because tonnage booked for July, August, and September would keep them busy through November. After the strike ends, there will be a delay of at least ten days before shipments become substantial.

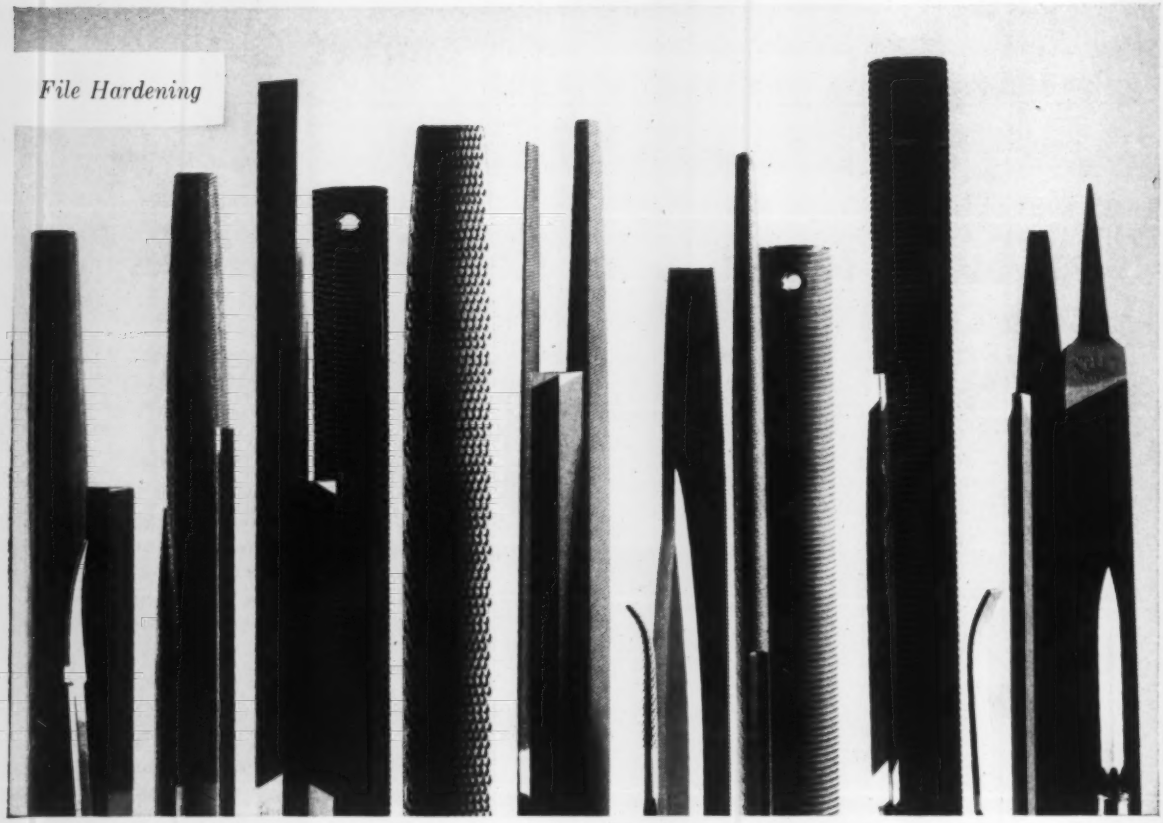
OUTPUT UP SLIGHTLY— Last week, steelmaking operations edged up to 12 per cent of capacity, eight-tenths of a percentage point above the previous week's revised rate. Production was about 340,000 ingot tons.

WHERE TO FIND MARKETS & PRICES

	News	Prices
Bars, Merchant	134	141
Reinforcing	...	142
Boiler Tubes	...	144
Canada	...	*
Clad Steel	133	145
Coke	158	147
Coal Chemicals	...	147
Charts:		
Finished Steel	...	139
Ingot Rate	138	...
Scrap Prices	...	153
Comparisons	...	139
Contracts Placed	138	...
Contracts Pend.	138	...
Electrodes	...	147
Fasteners	...	144
Ferroalloys	...	148
Fluorspar	...	147
Footnotes	...	144
Galvanized Steel	132	...
Imported Steel	...	147
Ingot Rates	138	...
Metal Powder	...	147
Nonferrous Met.	154	156
Ores	137	147
Pig Iron	137	146
Piling	...	141
Plates	134	141
Plating Material	...	157
Prestressed Strand	...	*
Price Indexes	...	139
Producers' Key	142	...
R.R. Materials	...	144
Refractories	...	147
Scrap	151	152
Semifinished	...	141
Service Centers	158	146
Sheets	133	142
Silicon Steel	...	143
Stainless Steel	...	145
Strip	133	143
Structurals	137	141
Surplus Steel	138	...
Tin Mill Prod.	135	143
Tool Steel	...	145
Tubular Goods	135	145
Wire	135	143

*Current prices were published in the Aug. 10 issue and will appear in subsequent issues.

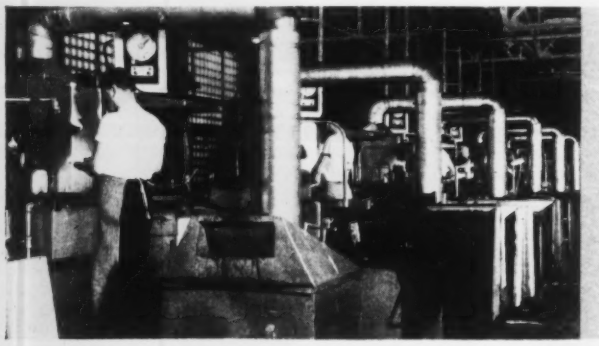
Metalworking Outlook—Page 35 Technical Outlook—Page 97



Nicholson File Co.: Many thousand files are hardened daily; Speedomax control helps keep rejects to absolute minimum.

Control of lead pot temperatures a problem?

Not at Nicholson File Co., Anderson, Ind., where Speedomax® H controllers are holding critical hardening temperatures to within ±5 F. With file hardening an art, Speedomax H permits a skilled operator to devote all his attention to producing a hard, straight, undistorted file. Since installing automatic control, *rejects have been minimized . . . pot life has increased substantially . . . new-operator training time appreciably reduced.* Rugged, compact and completely reliable, Speedomax H is providing similar process benefits on numerous other heat treat operations . . . is helping both to modernize production and to produce a quality product. Whatever your heat treat, it'll pay you to investigate Speedomax H! For details, contact your nearest L&N office or write 4957 Stenton Avenue, Philadelphia 44, Pennsylvania.



With automatic control holding pot temperatures to within ±5F, skilled operators can devote all their attention to producing files which consistently meet maximum hardness and straightness specs.

LEEDS Instruments **NORTHRUP** Automatic Controls • Furnaces

STEEL MILL SHIPMENTS—First Half 1959

MARKET GROUPS	Net Tons	Per Cent of Total
Automotive	9,951,879	20.67
Warehouses	8,867,767	18.41
Construction	6,188,611	12.85
Containers	4,533,634	9.41
Machinery	2,895,522	6.01
Contractors' products	2,489,433	5.17
Converters	2,024,420	4.20
Rail transportation	1,774,886	3.69
Electrical machinery	1,422,848	2.96
Domestic, commercial equipment	1,277,309	2.65
Appliances, utensils, cutlery	1,259,000	2.61
Exports	1,083,738	2.26
Unclassified	908,739	1.89
Agricultural	873,169	1.81
Fasteners	784,375	1.62
Forgings	634,089	1.32
Shipbuilding	470,978	0.99
Oil & gas drilling	405,048	0.84
Mining, quarrying, lumbering	169,877	0.35
Ordnance & other military	97,534	0.20
Aircraft	43,540	0.09
Totals	48,156,396	100.00

PRODUCTS	Net Tons	Per Cent of Total
Cold rolled sheets	8,847,498	18.37
Hot rolled sheets	5,485,862	11.39
Hot rolled bars	4,808,620	9.98
Plates	3,989,948	8.29
Electrolytic tin plate	3,510,124	7.29
Structural shapes	2,929,699	6.08
Line pipe	2,113,410	4.39
Semifinished	1,930,951	4.01
Galvanized sheets	1,876,683	3.90
Drawn wire	1,811,305	3.76
Standard pipe	1,549,892	3.22
Oil country tubular goods	1,482,295	3.08
Reinforcing bars	1,394,936	2.90
Cold finished bars	958,797	1.99
Rails & accessories	922,012	1.91
Cold rolled strip	898,853	1.87
Hot rolled strip	897,193	1.86
Mechanical tubing	552,928	1.15
Electrical sheets & strip	403,288	0.84
Pressure tubing	168,124	0.35
Tool steel	54,936	0.11
All other	1,569,042	3.26
Totals	48,156,396	100.00

First Half Mill Shipments Hit Peak

STEEL MILL shipments reached an all-time high of 48,156,396 tons in the first six months this year—a record for any half-year period, American Iron & Steel Institute figures show. The new record compared with the previous peak of 46,933,786 tons in the first six months of 1956; it topped the 28,699,218 tons shipped in the first half of last year, a recession period, by 68.5 per cent.

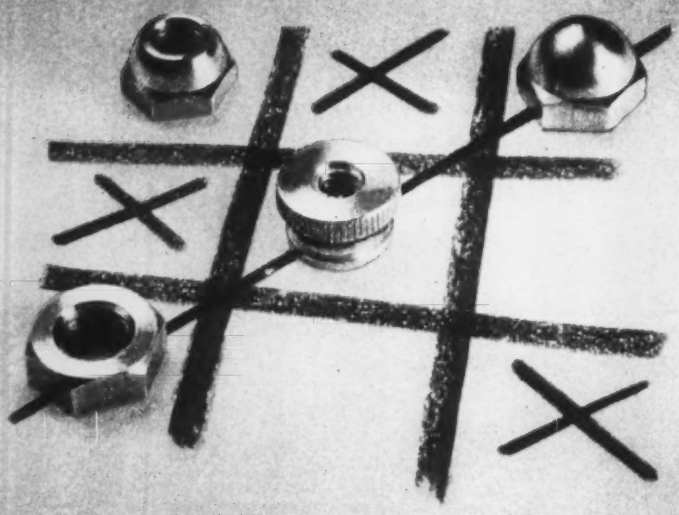
Contributing to the heavy movement in the first six months was the upturn in the country's general economy and strike hedge buying. The fact that the strike did develop and is still going on, with no early end in sight, points to a sharp reduction in the shipment of steel in the current half.

• **Many New Records**—Several buying categories established new first half records if not possibly all-time records for a calendar half. Automotive was one of the categories. Also included were containers; machinery, industrial equipment and tools; contractors' products; electrical machinery and equipment; and agricultural.

• **Exports Slip**—Shipments to all buying categories were up, with two exceptions: 1. Exports at 1,083,738 tons were off 222,383 tons from the corresponding period a year ago. 2. Ordnance and other military supplies at 97,534 tons were down 30,567 tons.

Automotive buyers, traditionally at or near the top, regained first place, surpassing both the warehouse and construction groups, which were first and second respectively in the first half of last year. Those three categories took 20.67, 18.41, and 12.85 per cent

FOR
MASS PRODUCED
PRECISION...



YOU CAN'T BEAT
Fischer TURNED
BRASS AND
ALUMINUM NUTS

In the game of tick-tack-toe, the right *second move* is very important. It can pre-determine the winner.

The same principle applies in purchasing precision nuts. *First:* decide the type and size of nut required. *Second:* specify the recognized source for quality, delivery and price . . . Fischer Special Mfg. Co.

As the leading producer of "turned" nuts, Fischer supplies standard, special and miniature nuts to exact customer specifications. Fischer nuts, mass produced by unique automatic machines, cost no more than those made by less precise methods . . . but their uniform accuracy assures fewer problems and new savings in fastening and assembly operations. *That makes you the winner!*

FOR DETAILS AND SPECIFICATIONS
SEND FOR CATALOG FS-1000.

there's no premium for precision at

Fischer SPECIAL MFG. CO.

476 MORGAN STREET • CINCINNATI 6, OHIO 8493-FS

respectively of all shipments.

Container manufacturers retained fourth position. The contractors' products group slipped from fifth to sixth, while machinery builders advanced from sixth to fifth. Converters hung onto seventh place.

The rail transportation industry jumped two positions to eighth, while electrical machinery manufacturers retained ninth place. Tenth was the domestic and commercial group, which last year was eleventh.

• **Most Products Gained**—Various records were established on the basis of products shipped—at least first half highs. These included cold rolled sheets, hot rolled sheets, electrolytic tin plate, galvanized sheets, and reinforcing bars.

Cold and hot rolled sheets were in first and second places, respectively (same as last year). With totals of 8,847,498 and 5,485,862 tons, they accounted for 18.37 and 11.39 per cent of all shipments.

Hot rolled bars jumped from fifth position to third, with a total of 4,808,620 tons, or 9.98 per cent. Reflecting in part a lag in shipwork, plates dropped from third to fourth position. Total movement of plates was 3,989,948 tons, or 9.29 per cent. Electrolytic tin plate was in fifth place, moving from fourth.

Others of the top ten (in proper sequence) were structural shapes and line pipe (each in the same relative position as last year—sixth and seventh), semifinished (eighth, instead of ninth), galvanized sheets (ninth instead of eighth) and drawn wire (tenth, same as last year).

More Galvanized Sheets Used in Highway Systems

Shipments of galvanized steel sheets for use in culverts, guard rails, and other highway construction items may rise to about 400,000 tons this year, predicts the Committee on Galvanized Steel Sheet Research, American Iron & Steel Institute, New York. Shipments to that market during 1958 amounted to 332,619 tons, a gain of 22 per cent over the 1957 total.

During the first quarter of 1959, shipments for highway use rose to 98,372 tons, a gain of 65 per cent over the total for the first quarter of 1958. With the growth of the

interstate highway system, continuous coated galvanized sheets are being specified for guard rails because of their strength and resistance to corrosion.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 142 & 143

Sheet steel consumers generally have not been affected much by the steel strike, although some hardship cases have developed. The deferment of two weeks in the original strike deadline helped many buyers to augment stocks. Should the labor deadlock continue over the remainder of the month, various plants will begin to feel the pinch.

Stockpiles in the automotive and appliance industries might last until late October. If the strike lasts until Sept. 1, automakers will be worried about December stampings and January assemblies.

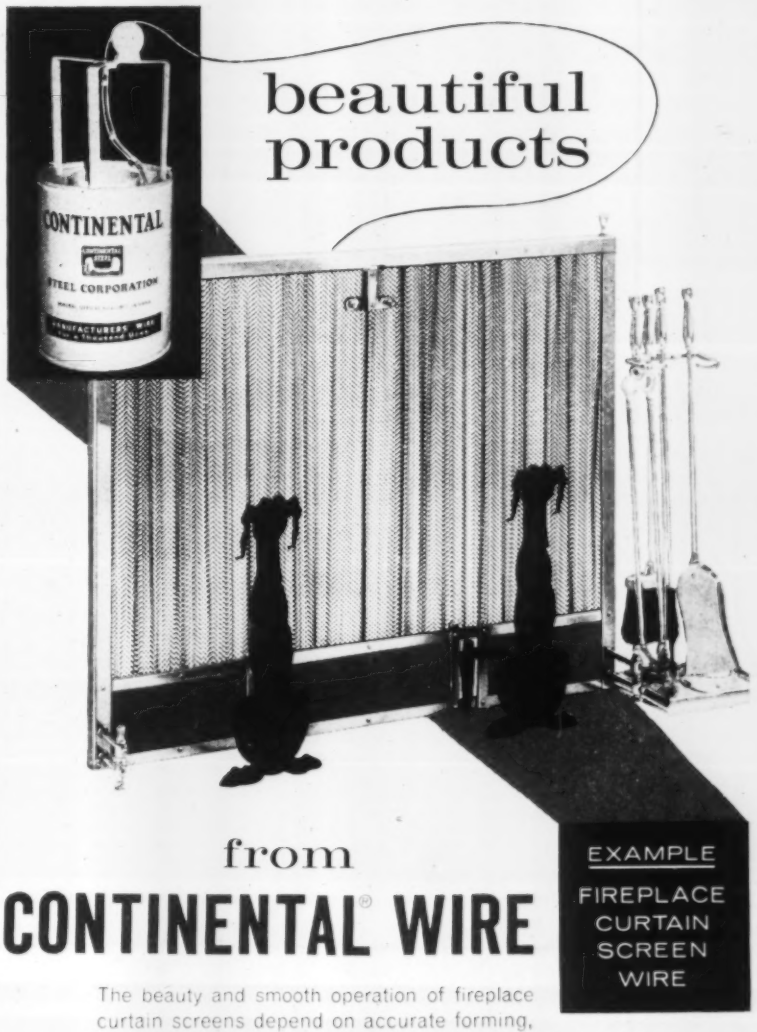
Most steelmakers are sold out through the third quarter. Sales offices of some companies are taking orders against October allotments, but users aren't pushing hard to get on their books. Order backlogs are so large some mills have refused to open their books for the fourth quarter. "Carryovers from June and tonnage booked for the third quarter will keep us busy through November," says one producer.

After the strike ends, at least 10 days will pass before steel shipments reach substantial volume. About the only tonnage shipped during the first two weeks will be material that was in process when the shutdown began.

The greatest stringency is in galvanized sheets which are in "phenomenal" demand. Also in short supply are cold rolled and hot rolled sheets. Consumer inventories of high carbon, narrow cold strip specialties are heavier than average flat rolled stocks in New England. Supply of razor blade steel is six to eight months.

Steelmakers feel they're not losing much tonnage to competitors that aren't strikebound. In most instances, the unstruck companies have all the business they can handle. They're under pressure from their regular customers whose supplementary sources of supply have been cut off.

Superior Steel Div., Copperweld



beautiful products

from

CONTINENTAL® WIRE

EXAMPLE

FIREPLACE CURTAIN SCREEN WIRE

The beauty and smooth operation of fireplace curtain screens depend on accurate forming, even spacing, and neat appearance of the mesh. The wire used must be of correct temper, diameter and finish. Uniformity of these properties is of prime importance. Leading fireplace equipment makers choose Continental Wire because it possesses these features dependably, in coil after coil. The ability to take intricate forming is an important reason why Continental Wire is specified for scores and scores of other products made with wire. Continental Curtain Screen wire, 19 gauge through 20 gauge inclusive in size, is available in 500 pound to 650 pound catchweight single length coils packed in Leverpac Drums for faster weaving with less down time, cleaner handling and better storage. For wire in practically any size, finish, temper or analysis, in low or medium low carbon steels, see Continental first!

Fine Finishes in Manufacturers' Wire

CONTINENTAL STEEL CORPORATION

KOKOMO • INDIANA

PRODUCERS OF: Manufacturers' Wire in many sizes, tempers and finishes, including Galvanized, KOKOTE, Flame-Sealed, Coppered, Tinned, Annealed, Liquor Finished, Bright and special shaped wire. Also Welded Wire Reinforcing Fabric Nails, Continental Chain Link Fence, and other products.

Steel Co., Carnegie, Pa., lowered prices on copper clad strip to these levels: Cold rolled clad 10 per cent two sides, $42.50 per 100 lb; one side, $35.85. The prices cover phosphorus deoxidized clad, red brass, and gilding metal.

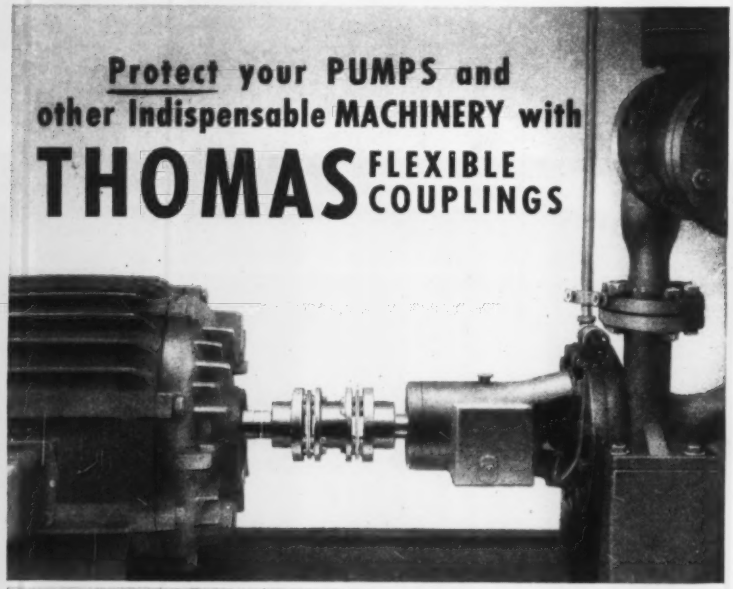
Steel Bars . . .

Bar Prices, Page 141

Bar demand is spotty. Inquiry is somewhat livelier than it was earlier in the strike period because of the poor prospects for an early settlement. Buyers know they can't get early shipment—on new orders, nothing before mid-October—but by placing orders now they will receive preferential treatment as soon as production is resumed. Some mills indicate it may take two to three weeks to get back to full operation once the strike is over because they haven't much semifinished in stock.

Consumer stocks are shrinking with metalworking shops finding it necessary to turn more and more to jobbers for tonnages to fill spot gaps. Users' inventories of hot rolled bars at the beginning of the strike were as large as they were before the 1957-58 stock liquidation cycle. Most cold drawers are set for four to six weeks. The majority of forgers can operate through mid-September. Other consumers can maintain their current production schedules for at least 60 days—some as long as 90, with fill-ins from service centers.

Automotive suppliers report better business than they anticipated. The carmakers are making feverish preparations for new models in expectation that 1960 will be the most competitive year in automotive history.



NO LUBRICATION NO MAINTENANCE NO WEARING PARTS

Future maintenance costs and shutdowns are eliminated when you install Thomas Flexible Couplings. These all-metal couplings are open for inspection while running.
They will protect your equipment and extend the life of your machines.
Properly installed and operated within rated conditions, Thomas Flexible Couplings should last a lifetime.

UNDER LOAD and MISALIGNMENT ONLY THOMAS FLEXIBLE COUPLINGS OFFER ALL THESE ADVANTAGES:

- Freedom from Backlash
- Torsional Rigidity
- Free End Float
- Smooth Continuous Drive with Constant Rotational Velocity
- Visual Inspection While in Operation
- Original Balance for Life
- No Lubrication
- No Wearing Parts
- No Maintenance

Write for Engineering Catalog 51A

THOMAS FLEXIBLE COUPLING COMPANY
WARREN, PENNSYLVANIA, U.S.A.

Plates . . .

Plate Prices, Page 141

Inquiry for carbon plates is somewhat larger. Even though inventories are still sizable, some users are ordering with greater urgency than they exhibited only a few days ago. July bookings of a leading producer in the Pittsburgh area exceeded those in June; August entries are close to capacity.

Tonnages booked for September delivery will not be shipped until June carryovers and backlogs accumulated during July and August have been cleared up. Plate consumers can't expect immediate service after the strike ends because some producers contemplate the installation of new equipment at their mills before resuming production. Even though the delays may cause temporary distress, they'll permit improvements which will enable suppliers to step up their output later.

Only two eastern plate mills are operating: Alan Wood Steel Co. (also a producer of sheets and strip) and Phoenix Steel Corp. at its Harrisburg, Pa., plant. Alan Wood has filled its September schedule and is booking orders for the fourth quarter.

Shipyard inventories are heavy enough to nearly finish the bulk of work in some eastern yards. Naval shipyards are taking slightly more tonnage for fourth quarter than they did for third quarter, but slightly less than the average for the first two quarters. Requirements for production of small tanks and large diameter pipe are slightly heavier in New England.

New England Tank Industries

Inc., Cambridge, Mass., was awarded a $3,748,800 contract for jet fuel storage at Portsmouth, N. H.

Activity in Pacific Coast shipyards is picking up. Todd Shipyards Corp., Long Beach, Calif., was awarded a $35 million contract for three ships for American Mail Lines. Shipbuilding Div., Pacific Coast District, Bethlehem Steel Co., is in line for two freighters costing $26.8 million for Pacific Far East Lines.

Tin Plate . . .

Tin Plate Prices, Page 143

Producers are nearly sold out for the balance of the year. Because the can manufacturers are expecting an enormous food pack, they're ordering as much metal as they can get. Steelmakers who have not been shut down aren't under much pressure from nonregular customers, but they're being asked to supply bigger than normal tonnages to regular accounts whose supplementary sources have been cut off.

Tubular Good . . .

Tubular Goods Prices, Page 145

Production of large diameter (16 to 22 in.) electricweld line pipe in the second half of this year probably will be slow because most of the utilities took delivery of all their 1959 requirements during the first half. A major producer in the Pittsburgh area is booking orders for shipment within three or four weeks of the date when steelmaking operations are resumed.

Demand for seamless line pipe (5 to 14 in. OD) is comparatively strong. One of the leading suppliers is sold out for three months. Even if it resumed production Sept. 1, it couldn't ship orders taken now before November.

Standard pipe orders are coming in slowly. Producers are having no trouble fitting them into their schedules.

Rotary oil drilling dropped to the lowest point since April during the week ended Aug. 3. A survey by Hughes Tool Co., Houston, showed 2109 rigs at work, the lowest number since the week of Apr. 23 when 2108 units were counted. The Hughes count reflected a 55-rig drop from the previous week, but the figure was still 258 higher than for the same period a year ago.

Wire . . .

Wire Prices, Pages 143 & 144

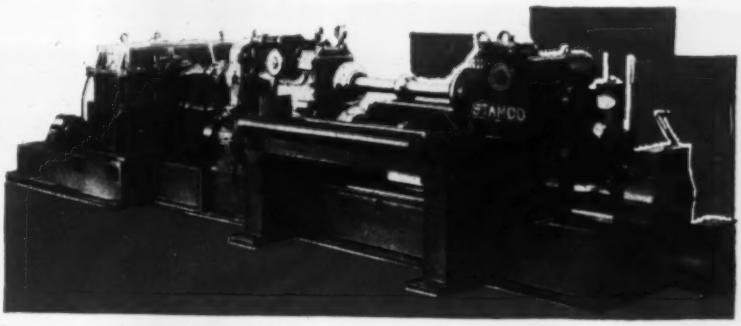
Operating wire mills are shipping their products as fast as they produce them and are unable to replenish inventories which were depleted during the first half. Some of the business comes from users whose regular sources are strikebound.

Products in strongest demand are manufacturers' wire, road mesh, and other construction items. Grain bin mesh also is active (a bumper corn harvest is predicted).

Small fastener producers in New England are more active turning out items for the 1960 model automobiles. They hold sufficient inventories to meet initial demands. The volume of fastener business to supply needs of other industries is also mounting.

Although demand for finished goods fabricated from wire is somewhat heavier than expected, inventories are sufficient to meet produc-

Top efficiency and versatility at low cost with Stamco side trimmer



A wide range of equipment is available for warehouse and mill duty on ferrous or non-ferrous materials. Stamco can solve your particular problem—economically. Contact us today. No obligation.

Stamco, Inc.
New Bremen, Ohio, U. S. A.

Slitting and Coiling Lines • Cut-To-Length Lines • Flying Shear Lines • Power Squaring Shears • Automatic Resquaring • Corrugating, Culvert and Steel Mill Equipment

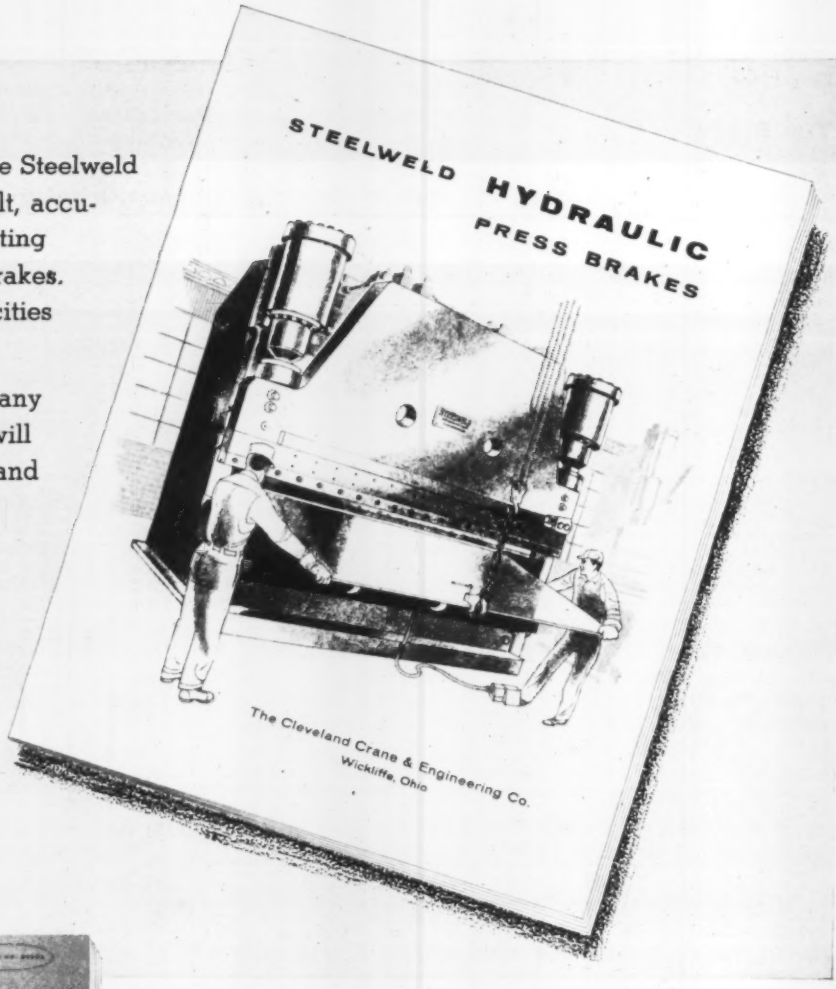
Ask for this

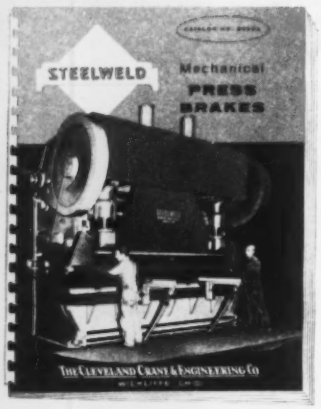
HYDRAULIC PRESS BRAKE CATALOG

Get the facts on the Steelweld Line of quality-built, accurate, smooth-operating Hydraulic Press Brakes. Available in capacities to 2000 tons.

Learn about the many fine features that will speed production and cut your costs.

Write for Free Catalog No. 2024





MECHANICAL PRESS BRAKES

For data on Steelweld Mechanical Press Brakes, ask for this free highly illustrated 52-page catalog—No. 2023.

Write for free copy of catalog No. 2023

STEELWELD
Mechanical and Hydraulic
PRESS BRAKES

Steelweld Machinery includes: Mechanical & Hydraulic Shears and Press Brakes, One-, Two- and Four-Point Straight-Side Presses, Speed-Draw Presses.

THE CLEVELAND CRANE & ENGINEERING CO. • 7876 EAST 281st STREET • WICKLIFFE, OHIO

tion needs through this quarter. By Oct. 1, however, shortages in some sizes and grades are likely in higher carbon categories.

Imports of rods and spring wire should provide some cushion. For several months, imports of wire other than merchant products have been mounting in the East. On the West Coast, newest estimates are that foreign sources are supplying between 60 and 65 per cent of all barbed wire consumed in that area.

Iron Ore . . .

Iron Ore Prices, Page 147

Engineering designs have been prepared for a proposed taconite processing facility near Atlantic City, Wyo., by the Columbia-Geneva Steel Div., U. S. Steel Corp. No definite plans have been made to proceed with deevlopment of the ore reserve near the site.

Fears are growing that a steel strike extending into September may cause a serious iron ore shortage with resultant plant shutdowns and more unemployment next winter. A Youngstown steel mill executive says it will be impossible for the lake fleet to haul enough ore if the strike goes into mid-September or October.

Some companies are moving as much ore as possible from the Labrador-Quebec mines via Seven Islands and the St. Lawrence Seaway, storing it on railroad docks in Lake Erie ports. That tonnage is moving mainly in Canadian or foreign ships, although Interlake Steamship Co., M. A. Hanna Co., and Wilson Marine Transit Co. have some boats engaged in this trade.

U. S. Steel Corp. is planning to concentrate the fleet of its Pittsburgh Steamship Div. upon conclusion of the strike in handling ore for the Chicago district. It will try to supply Youngstown and Pittsburgh blast furnace needs with Venezuelan ore moving via Philadelphia.

It will be extremely difficult to make up much of the lake movement by a railroad haul from Minnesota because this would create problems of car shortages, of unloading because of frozen ore, and of blending which usually is done during transfer between cars and ships. Plants using Labrador ore have run into trouble in unloading that material because it is so damp it packs down into the cars.

Pig Iron . . .

Pig Iron Prices, Page 146

Foundries are buying merchant iron in an orderly manner, but they are not scrambling for supplies. They seem confident there will be sufficient iron to cover all needs despite the continuing steel strike. Their operations are curtailed by mass vacations, but are expected to pick up gradually late this quarter.

Structural Shapes . . .

Structural Shape Prices, Page 141

Even though they were reluctant to stock up on standard lengths because of waste problems, fabricators are pretty well protected for the third quarter. Perhaps 8 out of 10 have enough steel to sustain operations for three months.

While they have adequate stocks of plain material, fabricators find it impossible to maintain completely rounded stocks in handling new contracts. Consequently, they must

Iron Ore Statistics—June, 1959

Stocks of Iron Ore and Agglomerates in U. S. and Canada

(Gross tons)

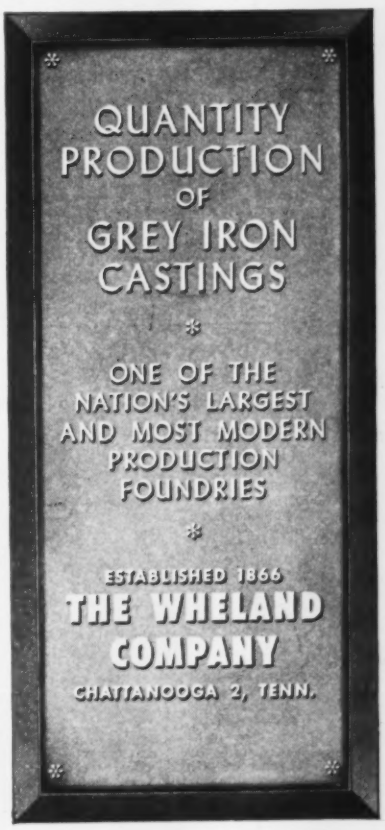
STOCKS AT	U. S. Ores L. Superior	U. S. Ores Other	Canadian Ores L. Superior	Canadian Ores Other	Foreign Ores	Total For Month
U. S. Furnaces:						
Eastern	3,180,391	284,345	123,445	1,499,312	3,336,046	8,423,539
Pitts.-Valley	7,918,598	32,692	397,904	2,064,292	3,144,649	13,558,135
Cleve.-Detroit	6,977,552	104,694	386,853	221,596	403,089	8,093,784
Chicago	8,927,158	(a)	(a)	.....	(a)	8,927,158
Southern	(a)	1,739,700	.....	(a)	2,084,709	3,824,409
Western	.....	919,402	.....	.....	(a)	919,402
Total	27,003,699	3,080,833	908,202	3,785,200	8,968,493	43,746,427
At U. S. Docks:						
Lake Erie	2,868,502	.....	112,246	1,162,455	.....	4,143,203
Other	.....	.....	.....	(a)	(a)	(a)
Total	2,868,502	.....	112,246	1,162,455	(a)	4,143,203
Total U. S. Stocks	29,872,201	3,080,833	1,020,448	4,947,655	8,968,493	47,889,630
Total Canadian	1,678,952	.....	47,875	322,825	37,164	2,086,816
Total U. S.-Canada	31,551,153	3,080,833	1,068,323	5,270,480	9,005,657	49,976,446

Consumption of Iron Ore and Agglomerates in U. S. and Canada

(Gross tons)

In U. S. Districts:	U. S. Ores L. Superior	U. S. Ores Other	Canadian Ores L. Superior	Canadian Ores Other	Foreign Ores	Total For Month
Eastern	707,812	209,887	47,967	293,817	1,057,945	2,317,428
Pitts.-Valley	2,289,345	125,227	56,384	435,665	650,739	3,557,360
Cleve.-Detroit	1,261,445	49,508	95,660	44,373	149,181	1,600,167
Chicago	2,177,020	(a)	(a)	.....	(a)	2,177,020
Southern	(a)	610,018	.....	(a)	236,456	846,474
Western	.....	632,907	.....	.....	(a)	632,907
In U. S.:						
Blast furnaces	4,664,944	1,089,998	156,595	471,168	685,848	7,068,553
Steel furnaces	168,283	67,871	14,064	9,829	600,873	860,920
Sintering (1)	1,602,337	467,986	28,849	292,858	807,491	3,199,521
Miscellaneous (2)	58	1,692	503	.....	109	2,362
Total U. S.	6,435,622	1,627,547	200,011	773,855	2,094,321	11,131,356
In Canada:						
Blast furnaces	212,835	.....	99,667	66,176	.....	378,678
Steel furnaces	4,752	.....	.....	14,235	11,780	30,767
Sintering (1)	63,903	.....	24,548	28,998	472	117,921
Miscellaneous (2)	.....	.....	.....	.....	.....	.....
Total Canada	281,490	.....	124,215	109,409	12,252	527,366
Total U. S.-Canada	6,717,112	1,627,547	324,226	883,264	2,106,573	11,658,722

a—Individual company data included in other districts.
1—Consumed at sintering plants not located at mine site.
2—Sold to nonreporting companies or used for purposes not listed.
Data from American Iron Ore Association.



frequently turn to service centers for certain items.

Carbuilders bought heavily in the second quarter and the bulk of their tonnage was shipped before the strike. Since most of their cars are scheduled for yearend delivery, they're in no great danger.

Bridge and highway programs have received a setback by virtue of a snarl in Congress over federal appropriations for this work.

New York state bids on a number of projects scheduled originally for Aug. 6 have been postponed until Sept. 10. Bids on some other jobs have been postponed indefinitely. Considerable highwaywork has also been held up in Connecticut and New Jersey.

That knocks the bottom out of the structural market at the moment, as private inquiry is spotty and relatively light.

Offers Surplus Steel

The Ravenna (Ohio) Arsenal is offering 250 tons of its surplus steel. The material consists of 12,000 pieces of used channels in 6 to 11 ft lengths, 1.41 in. wide, and 3 in. deep. The number of bidders is expected to be limited due to the specifications.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

885 tons, subway station, 59th Street and Lexington Avenue, New York, through Slattery Construction Co., to Pine Brook Iron Works, Scranton, Pa.

821 tons, state bridgework, Essex County, New Jersey, through Franklin Contracting Co., general contractor, to American Bridge Div., United States Steel Corp., Pittsburgh.

700 tons, transmission towers, Philadelphia Electric Co., Philadelphia, to American Bridge Div., United States Steel Corp., Pittsburgh.

700 tons, Bomarc facilities, Langley Field, Va., to Dresser-Ideco Inc., Columbus, Ohio; Virginia Engineering Co. Inc., Newport News, Va., general contractor.

548 tons, state bridgework, Middlesex County, New Jersey, through George M. Brewster, Bogota, N. J., general contractor, to Irvington Steel & Iron Works Inc., New Brunswick, N. J.

450 tons, Public School No. 139, New York, through Mars Associates Inc., general contractor, to Bethlehem Fabricators Inc., Bethlehem, Pa.

155 tons, switchyard steel, Ft. Peck Dam project, U. S. Engineer, Riverdale, N. Dak., to Schwager-Wood Corp., Portland, Oreg.

100 tons, two state bridges, Wakefield, Mass., to West End Iron Works, Cambridge, Mass.; Coleman Bros. Corp., Readville, Mass., general contractor.; 75 tons, reinforcing bars, to Northern Steel Inc., Boston.

100 tons, structurals and bars; high school, Portland, Conn., to New England Iron Works, New Haven, Conn., and Joseph T. Ryerson & Son Inc., Boston; Hayes Construction Co., New Britain, Conn., general contractor.

STRUCTURAL STEEL PENDING

10,000 tons, building, Smithsonian Institution, Washington; General Services Administration postponed opening of bids from Aug. 4 until Aug. 18.

3026 tons, state bridgework, Somerset County, New Jersey; Yonkers Construction Co., Yonkers, N. Y., low on general contract.

1282 tons, grandstand, Yonkers Raceway, Yonkers, N. Y., postponed indefinitely; Yonkers Construction Co., that city, was originally low on the general contract.

1000 tons, approach section, George Washington Bridge New York; bids Aug. 18.

550 tons, bridge, Missouri River, Big Bend Reservoir project near Ft. Thompson, S. Dak.

300 tons, nurses residence, Metropolitan Hospital, New York; bids Aug. 12.

290 tons, WF beam bridges, Brattleboro-Dummerston, Vt.

280 tons, building, Pharmaceutical Laboratories Inc., Long Island City, N. Y.; pending.

257 tons, Public School No. 262, Brooklyn, N. Y.; Caristo Construction Co., that city, low on general contract.

REINFORCING BARS . . .

REINFORCING BARS PLACED

500 tons, Bomarc facilities, Langley Field, Va., to Hall-Hodges Co., Norfolk, Va.; Virginia Engineering Co. Inc., Newport News, Va., general contractor.

300 tons, General Stores Supply, Navy, Philadelphia, to Pine Steel Div., Southern Asia Corp., New York.

REINFORCING BARS PENDING

930 tons, Corps of Engineers, Chicago; bids Sept. 4, three lots.

635 tons, bridges and drainage structures, Brattleboro-Dummerston, Vt.

PLATES . . .

PLATES PLACED

1500 tons, alloy, high tensile, naval shipyard, Portsmouth, N. H., to U. S. Steel Corp., Pittsburgh.

365 tons, carbon, Brookley Air Force Base, Alabama, to Phoenix Steel Corp., Harrisburg, Pa.

200 tons, alloy, high tensile, General Stores Supply, Navy, Philadelphia, to Phoenix Steel Corp., Harrisburg, Pa.; also 55 tons, stainless, to Ingersoll Steel Div., Borg-Warner Corp., Chicago.

PLATES PENDING

500 tons, large diameter pipe (mostly 60 in.), tunnel extension, Malden-Medford, Mass.; bids to Metropolitan District Commission, Boston.

PIPE . . .

CAST IRON PIPE PENDING

165 tons, cast iron pipe and fittings, tunnel extension, Malden-Medford, Mass.; bids to Metropolitan District Commission, Boston.

STEEL PIPE PLACED

4875 tons, steel pipe, Brooklyn Union Gas Co., Brooklyn, N. Y., to the Claymont, Del., mill of Colorado Fuel & Iron Corp., Denver.

RAILS, CARS . . .

LOCOMOTIVES PLACED

Tennessee, Alabama & Georgia, one 1800 hp road switcher, to Electro-Motive Div., General Motors Corp., La Grange, Ill.

RAILROAD CARS PLACED

New York Central, 400 hopper cars, to Despatch Shops Inc., East Rochester, N. Y.

Louisville & Nashville, 150 boxcars to Pullman-Standard Div., Pullman Inc., Chicago. In addition, the railroad will convert 738 hoppers from wood to steel sides, at its Louisville shops.

Pacific Fruit Express, 1025 sixty-ton mechanical refrigerator cars, to own shops.

Western Pacific, 50 seventy-ton insulated boxcars to Pullman-Standard Div., Pullman Inc., Chicago.

New York City Transit Authority, 100 subway cars to ACF Industries Inc., New York, subject to approval of Municipal Board of Estimate.

DISTRICT INGOT RATES

(Percentage of Capacity Engaged)

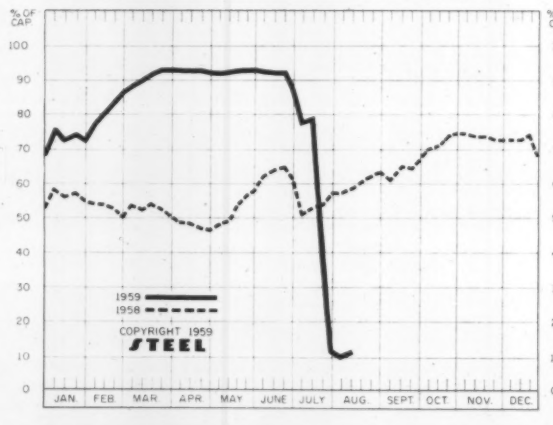
	Week Ended Aug. 16	Change	Same Week 1958	Same Week 1957
Pittsburgh	2.5	+ 0.5	52.5	82
Chicago	5.5	0	69	86
Eastern	10	+ 1	60	86.5
Youngstown	9	0	53	79
Wheeling	52	+ 1.5*	74	96
Cleveland	6	0	53.5	90
Buffalo	4	0	51.5	96
Birmingham	9	0	53.5	85.5
Cincinnati	57	+ 9*	72	79
St. Louis	57	+ 5	74.5	84.5
Detroit	23.5	— 0.5	68.5	52.5
Western	8	+ 3	70	97
National Rate	12	+ 0.8*	60.5	80.5

INGOT PRODUCTION

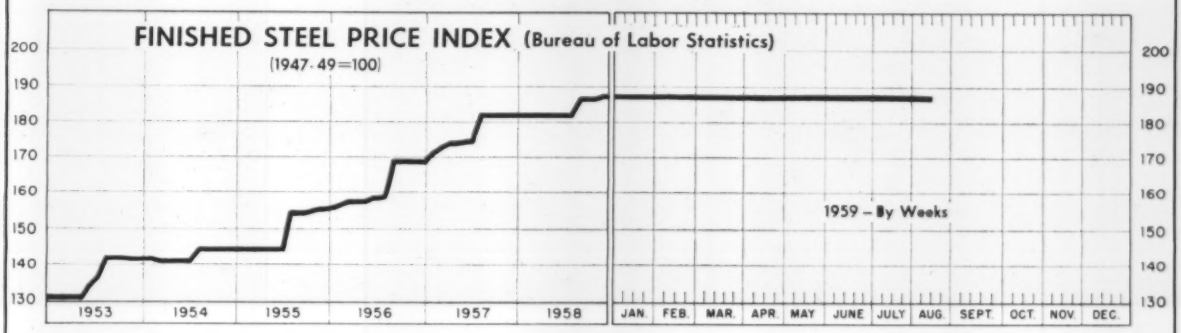
	Week Ended Aug. 16	Week Ago	Month Ago	Year Ago
INDEX (1947-49=100)	21.2†	19.8	68.3	101.6
NET TONS (In thousands)	340†	318	1,097	1,632

*Change from preceding week's revised rate.
†Estimated by STEEL; comparative figures reported by AISI.
Weekly capacity (net tons): 2,831,331 in 1959; 2,699,173 in 1958; 2,559,490 in 1957.

NATIONAL STEELWORKS OPERATIONS



Price Indexes and Composites



Aug. 11, 1959	Week Ago	Month Ago	July Avg.	Year Ago
186.7	186.7	186.7	186.7	186.3

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Aug. 4

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard No. 1	$5.825
Rails, Light, 40 lb	7.292
Tie Plates	6.875
Axles, Railway	10.175
Wheels, Freight Car, 33 in. (per wheel)	62.000
Plates, Carbon	6.350
Structural Shapes	6.167
Bars, Tool Steel, Carbon (lb)	0.560
Bars, Tool Steel, Alloy, Oil Hardening Die (lb)	0.680
Bars, Tool Steel, H.R. Alloy, High Speed, W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.060 (lb)	1.400
Bars, Tool Steel, H.R. Alloy, High Speed, W18, Cr 4, V 1 (lb)	1.895
Bars, H.R., Alloy	10.775
Bars, H.R., Stainless, 303 (lb)	0.543
Bars, H.R., Carbon	6.675
Bars, Reinforcing	6.385
Bars, C.F., Carbon	10.710
Bars, C.F., Alloy	14.125
Bars, C.F., Stainless, 302 (lb)	0.570
Sheets, H.R., Carbon	6.350
Sheets, C.R., Carbon	7.300
Sheets, Galvanized	8.615
Sheets, C.R., Stainless, 302 (lb)	0.658
Sheets, Electrical	12.625
Strip, C.R., Carbon	9.489
Strip, C.R., Stainless, 430 (lb)	0.480
Strip, H.R., Carbon	6.250
Pipe, Black, Buttweld (100 ft)	19.905
Pipe, Galv., Buttweld (100 ft)	23.253
Pipe, Line (100 ft)	199.533
Casing, Oil Well, Carbon (100 ft)	201.080
Casing, Oil Well, Alloy (100 ft)	315.213
Tubes, Boiler (100 ft)	51.200
Tubing, Mechanical, Carbon (100 ft)	27.005
Tubing, Mechanical, Stainless, 304 (100 ft)	205.608
Tin Plate, Hot-dipped, 1.25 lb (95 lb base box)	10.100
Tin Plate, Electrolytic, 0.25 lb (95 lb base box)	8.800
Black Plate, Canmaking Quality (95 lb base box)	7.900
Wire, Drawn, Carbon	10.575
Wire, Drawn, Stainless, 430 (lb)	0.665
Bale Ties (bundles)	7.967
Nails, Wire, 8d Common	9.825
Wire, Barbed (80-rod spool)	8.722
Woven Wire Fence (20-rod roll)	21.737

STEEL's FINISHED STEEL PRICE INDEX*

	Aug. 12 1959	Week Ago	Month Ago	Year Ago	5 Yr Ago
Index (1935-39 avg=100)	247.82	247.82	247.82	246.65	195.87
Index in cents per lb	6.713	6.713	6.713	6.682	5.306

STEEL's ARITHMETICAL COMPOSITES*

	Aug. 12 1959	Week Ago	Month Ago	Year Ago	5 Yr Ago
Finished Steel, NT	$149.96	$149.96	$149.96	$149.28	$117.77
No. 2 Fdry. Pig Iron, GT.	66.49	66.49	66.49	66.49	56.54
Basic Pig Iron, GT	65.99	65.99	65.99	65.99	56.04
Malleable Pig Iron, GT	67.27	67.27	67.27	67.27	57.27
Steelmaking Scrap, GT	38.33	38.33	38.67	41.33	28.50

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

Comparison of Prices

Comparative prices by districts in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	Aug. 12 1959	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bars, H.R., Pittsburgh	5.675	5.675	5.675	5.675	4.30
Bars, H.R., Chicago	5.675	5.675	5.675	5.675	4.30
Bars, H.R., deld., Philadelphia	5.975	5.975	5.975	5.975	4.55
Bars, C.F., Pittsburgh	7.65*	7.65*	7.65*	7.65*	5.40
Shapes, Std., Pittsburgh	5.50	5.50	5.50	5.50	4.25
Shapes, Std., Chicago	5.50	5.50	5.50	5.50	4.25
Shapes, deld., Philadelphia	5.77	5.77	5.77	5.77	4.53
Plates, Pittsburgh	5.30	5.30	5.30	5.30	4.225
Plates, Chicago	5.30	5.30	5.30	5.30	4.225
Plates, Coatesville, Pa.	5.30	5.30	5.30	5.30	4.225
Plates, Sparrows Point, Md.	5.30	5.30	5.30	5.30	4.225
Plates, Claymont, Del.	5.30	5.30	5.30	5.30	4.225
Sheets, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.05
Sheets, H.R., Chicago	5.10	5.10	5.10	5.10	4.05
Sheets, C.R., Pittsburgh	6.275	6.275	6.275	6.275	4.95
Sheets, C.R., Chicago	6.275	6.275	6.275	6.275	4.95
Sheets, C.R., Detroit	6.275	6.275	6.275	6.275	5.10
Sheets, Galv., Pittsburgh	6.875	6.875	6.875	6.875	5.45
Strip, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.05
Strip, H.R., Chicago	5.10	5.10	5.10	5.10	4.05
Strip, C.R., Pittsburgh	7.425	7.425	7.425	7.425	5.75
Strip, C.R., Chicago	7.425	7.425	7.425	7.425	6.00
Strip, C.R., Detroit	7.425	7.425	7.425	7.425	5.60-5.90
Wire, Basic, Pittsburgh	8.00	8.00	8.00	8.00	5.75
Nails, Wire, Pittsburgh	8.95	8.95	8.95	8.95	6.85
Tin plate (1.50 lb)box,Pitts.	$10.65	$10.65	$10.65	$10.30	$8.95

*Including 0.35c for special quality.

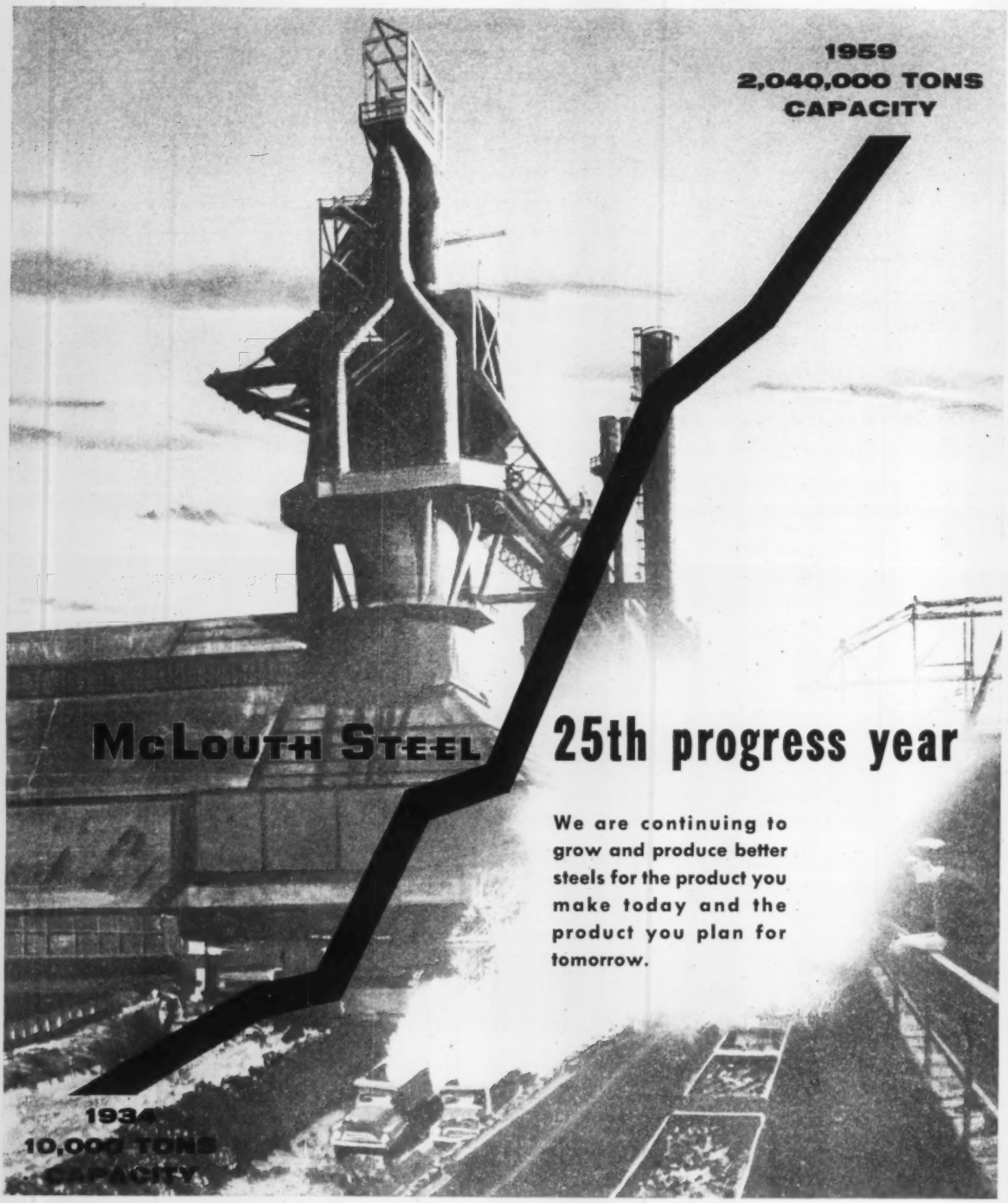
SEMIFINISHED STEEL					
Billets, forging, Pitts. (NT)	$99.50	$99.50	$99.50	$99.50	$78.00
Wire rods 5/32-5/8" Pitts.	6.40	6.40	6.40	6.40	4.675

PIG IRON, Gross Ton	Aug. 12 1959	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bessemer, Pittsburgh	$67.00	$67.00	$67.00	$67.00	$57.00
Basic, Valley	66.00	66.00	66.00	66.00	56.00
Basic, deld., Philadelphia	70.41	70.41	70.41	70.41	49.66
No. 2 Fdry, NevilleIsland,Pa.	66.50	66.50	66.50	66.50	56.50
No. 2 Fdry, Chicago	66.50	66.50	66.50	66.50	56.50
No. 2 Fdry, deld., Phila.	70.91	70.91	70.91	70.91	50.16
No. 2 Fdry, Birmingham	62.50	62.50	62.50	62.50	52.88
No. 2 Fdry(Birm.)deld., Cin.	70.20	70.20	70.20	70.20	60.43
Malleable, Valley	66.50	66.50	66.50	66.50	56.50
Malleable, Chicago	66.50	66.50	66.50	66.50	56.50
Ferromanganese, net ton†	245.00	245.00	245.00	245.00	200.00

†74-76% Mn, Duquesne, Pa.

SCRAP, Gross Ton (Including broker's commission)					
No. 1 Heavy Melt, Pittsburgh	$38.50	$38.50	$39.50	$42.50	$29.50
No. 1 Heavy Melt, E. Pa.	40.00	40.00	40.00	38.00	26.00
No. 1 Heavy Melt, Chicago	36.50	36.50	36.50	43.50	30.00
No. 1 Heavy Melt, Valley	41.50	41.50	41.50	43.50	29.50
No. 1 Heavy Melt, Cleve.	38.50	38.50	38.50	40.00	28.00
No. 1 Heavy Melt, Buffalo	33.50	33.50	33.50	34.50	26.50
Rails, Rerolling, Chicago	59.50	59.50	59.50	64.50	44.50
No. 1 Cast, Chicago	53.50	52.50	52.50	46.50	35.50

COKE, Net Ton					
Beehive, Furn., Connlsvl.	$15.00	$15.00	$15.00	$15.25	$14.75
Beehive, Fdry., Connlsvl.	18.25	18.25	18.25	18.25	16.75
Oven, Fdry., Milwaukee	32.00	32.00	32.00	30.50	25.25



McLOUTH STEEL CORPORATION

HOT AND COLD ROLLED SHEET AND STRIP STEELS

Detroit 17, Michigan

Steel Prices

Mill prices as reported to STEEL, Aug. 12, cents per pound except as otherwise noted. *Changes shown in italics.* Code number following mill point indicates producing company. Key to producers, page 142; footnotes, page 144.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)
Munhall,Pa. U5 .....$76.00

INGOTS, Alloy (NT)
Detroit S41 .....$82.00
Economy,Pa. B14 ....82.00
Farrell,Pa. S3 .....82.00
Lowellville,O. S3 ....82.00
Midland,Pa. C18 .....82.00
Munhall,Pa. U5 .....82.00
Sharon,Pa. S3 .....82.00

BILLETS, BLOOMS & SLABS Carbon, Rerolling (NT)
Bartonville,Ill. K4 ...$82.00
Bessemer,Pa. U5 .....80.00
Buffalo R2 .....80.00
Clairton,Pa. U5 .....80.00
Ensley,Ala. T2 .....80.00
Fairfield,Ala. T2 .....80.00
Fontana,Calif. K1 ....90.50
Gary,Ind. U5 .....80.00
Johnstown,Pa. B2 ....80.00
Lackawanna,N.Y. B2..80.00
Munhall,Pa. U5 .....80.00
Owensboro,Ky. G8 ....80.00
S.Chicago,Ill. R2, U5 ..80.00
S.Duquesne,Pa. U5 ....80.00
Sterling,Ill. N15 .....80.00
Youngstown R2 .....80.00

Carbon, Forging (NT)
Bessemer, Pa. U5 ....$99.50
Buffalo R2 .....99.50
Canton,O. R2 .....102.00
Clairton, Pa. U5 .....99.50
Conshohocken,Pa. A3..104.50
Ensley,Ala. T2 .....99.50
Fairfield,Ala. T2 .....99.50
Farrell,Pa. S3 .....99.50
Fontana,Calif. K1 ....109.00
Gary,Ind. U5 .....99.50
Geneva,Utah C11 .....99.50
Houston S5 .....104.50
Johnstown,Pa. B2 ....99.50
Lackawanna,N.Y. B2..99.50
LosAngeles B3 .....109.00
Midland,Pa. C18 .....99.50
Munhall,Pa. U5 .....99.50
Owensboro,Ky. G8 ....99.50
Seattle B3 .....109.00
Sharon,Pa. S3 .....99.50
S.Chicago R2, U5, W14..99.50
S.Duquesne,Pa. U5 ....99.50
S.SanFrancisco B3 ....109.00
Warren,O. C17 .....99.50

Alloy, Forging (NT)
Bethlehem,Pa. B2 ..$119.00
Bridgeport,Conn. C32..119.00
Buffalo R2 .....119.00
Canton,O. R2, T7 ....119.00
Conshohocken,Pa. A3..126.00
Detroit S41 .....119.00
Economy,Pa. B14 ....119.00
Farrell,Pa. S3 .....119.00
Fontana,Calif. K1 ....140.00
Gary,Ind. U5 .....119.00
Houston S5 .....124.00
Ind.Harbor,Ind. Y1 ..119.00
Johnstown,Pa. B2 ....119.00
Lackawanna,N.Y. B2..119.00
LosAngeles B3 .....139.00
Lowellville,O. S3 ....119.00
Massillon,O. R2 .....119.00
Midland,Pa. C18 ....119.00
Munhall,Pa. U5 .....119.00
Owensboro,Ky. G8 ..119.00
Sharon,Pa. S3 .....119.00
S.Chicago R2,U5,W14..119.00
S.Duquesne,Pa. U5 ..119.00
Struthers,O. Y1 .....119.00
Warren,O. C17 .....119.00

ROUNDS, SEAMLESS TUBE (NT)
Buffalo R2 .....$122.50
Canton,O. R2 .....125.00
Cleveland R2 .....122.50
Gary,Ind. U5 .....122.50
S.Chicago,Ill. R2, W14 122.50
S.Duquesne,Pa. U5 ..122.50
Warren,O. C17 .....122.50

SKELP
Aliquippa,Pa. J5 .....5.05
Munhall,Pa. U5 .....5.05
Pittsburgh J5 .....5.05
Warren,O. R2 .....5.05
Youngstown R2, U5 ....5.05

WIRE RODS
AlabamaCity,Ala. R2 ..6.40
Aliquippa,Pa. J5 .....6.40
Alton,Ill. L1 .....6.60
Bartonville,Ill. K4 ....6.50
Buffalo W12 .....6.40
Cleveland A7 .....6.40
Donora,Pa. A7 .....6.40
Fairfield,Ala. T2 .....6.40
Houston S5 .....6.65
IndianaHarbor,Ind. Y1..6.40
Johnstown,Pa. B2 .....6.40
Joliet,Ill. A7 .....6.40
KansasCity,Mo. S5 ....6.65
Kokomo,Ind. C16 .....6.50
LosAngeles B3 .....7.20
Minnequa,Colo. C10 ....6.65
Monessen,Pa. P7 .....6.40
Pittsburg,Calif. C11 ....7.20
Portsmouth,O. P12 ....6.40
Roebling,N.J. R5 .....6.50
S.Chicago,Ill. R2, W14..6.40
SparrowsPoint,Md. B2..6.50
Sterling,Ill.(1) N15 ....6.40
Sterling,Ill. N15 .....6.50
Struthers,O. Y1 .....6.40
Worcester,Mass. A7 ....6.70

STRUCTURALS

Carbon Steel Std. Shapes
AlabamaCity,Ala. R2 ..5.50
Aliquippa,Pa. J5 .....5.50
Atlanta A11 .....5.70
Bessemer,Ala. T2 .....5.50
Bethlehem,Pa. B2 .....5.55
Birmingham C15 .....5.50
Clairton,Pa. U5 .....5.50
Fairfield,Ala. T2 .....5.50
Fontana,Calif. K1 ....6.30
Gary,Ind. U5 .....5.50
Geneva,Utah C11 .....5.50
Houston S5 .....5.60
Ind.Harbor,Ind. I-2, Y1.5.50
Johnstown,Pa. B2 .....5.55
Joliet,Ill. P22 .....5.50
KansasCity,Mo. S5 ....5.60
Lackawanna,N.Y. B2 ..5.55
LosAngeles B3 .....6.20
Minnequa,Colo. C10 ....5.80
Munhall,Pa. U5 .....5.50
Niles,Calif. P1 .....6.25
Phoenixville,Pa. P4 ....5.55
Portland,Oreg. O4 .....6.25
Seattle B3 .....6.25
S.Chicago,Ill. U5, W14..5.50
S.SanFrancisco B3 ....6.15
Sterling,Ill. N15 .....5.50
Torrance Calif. C11 ....6.20
Weirton,W.Va. W6 ....5.50

Wide Flange
Bethlehem,Pa. B2 .....5.55
Clairton,Pa. U5 .....5.50
Fontana,Calif. K1 ....6.45
IndianaHarbor,Ind. I-2..5.50
Lackawanna,N.Y. B2 ..5.55
Munhall,Pa. U5 .....5.50
Phoenixville,Pa. P4 ....5.55
S.Chicago,Ill. U5 .....5.50
Sterling,Ill. N15 .....5.50
Weirton,W.Va. W16 ....5.50

Alloy Std. Shapes
Aliquippa,Pa. J5 .....6.80
Clairton,Pa. U5 .....6.80
Gary,Ind. U5 .....6.80
Houston S5 .....6.90
Munhall,Pa. U5 .....6.80
S.Chicago,Ill. U5, W14..6.80

H.S., L.A., Std. Shapes
Aliquippa,Pa. J5 .....8.05
Bessemer,Ala. T2 .....8.05
Bethlehem,Pa. B2 .....8.10
Clairton,Pa. U5 .....8.05
Fairfield,Ala. T2 .....8.05
Fontana,Calif. K1 .....8.85
Gary, Ind. U5 .....8.05
Geneva,Utah C11 .....8.05
Houston S5 .....8.15
Ind.Harbor,Ind. I-2, Y1.8.05
Johnstown,Pa. B2 .....8.10
KansasCity,Mo. S5 ....8.15
Lackawanna,N.Y. B2 ..8.10
LosAngeles B3 .....8.75
Munhall,Pa. U5 .....8.05
Seattle B3 .....8.80
S.Chicago,Ill. U5, W14..8.05
S.SanFrancisco B3 ....8.70
Sterling,Ill. N15 .....7.75
Struthers,O. Y1 .....8.05

H.S., L.A., Wide Flange
Bethlehem,Pa. B2 .....8.10
Ind.Harbor,Ind. I-2 ....8.05
Lackawanna,N.Y. B2 ..8.10
Munhall,Pa. U5 .....8.05
S.Chicago,Ill. U5 .....8.05
Sterling,Ill. N15 .....7.75

PILING

BEARING PILES
Bethlehem,Pa. B2 .....5.55
Ind.Harbor,Ind. I-2 ....5.50
Lackawanna,N.Y. B2 ..5.55
Munhall,Pa. U5 .....5.50
S.Chicago,Ill. I-2, U5 ..5.50

STEEL SHEET PILING
Ind.Harbor,Ind. I-2 ....6.50
Lackawanna,N.Y. B2 ..6.50
Munhall,Pa. U5 .....6.50
S.Chicago,Ill. I-2, U5 ..6.50
Weirton,W.Va. W6 ....6.50

PLATES

PLATES, Carbon Steel
AlabamaCity,Ala. R2 ..5.30
Aliquippa,Pa. J5 .....5.30
Ashland,Ky.(15) A10 ..5.30
Atlanta A11 .....5.50
Bessemer,Ala. T2 .....5.30
Clairton,Pa. U5 .....5.30
Claymont,Del. C22 ....5.30
Cleveland J5, R2 .....5.30
Coatesville,Pa. L7 ....5.30
Conshohocken,Pa. A3 ..5.30
Ecorse,Mich. G5 .....5.30
Fairfield,Ala. T2 .....5.30
Farrell,Pa. S3 .....5.30
Fontana,Calif.(30) K1 ..6.10
Gary,Ind. U5 .....5.30
Geneva,Utah C11 .....5.30
GraniteCity,Ill. G4 ....5.40
Harrisburg,Pa. P4 .....5.30
Houston S5 .....5.40
Ind.Harbor,Ind. I-2, Y1.5.30
Johnstown,Pa. B2 .....5.30
Lackawanna,N.Y. B2 ..5.30
Mansfield,O. E6 .....5.30
Minnequa,Colo. C10 ....6.15
Munhall,Pa. U5 .....5.30
Newport,Ky. A2 .....5.30
Pittsburgh J5 .....5.30
Riverdale,Ill. A1 .....5.30
Seattle B3 .....6.20
Sharon,Pa. S3 .....5.30
S.Chicago,Ill. U5, W14..5.30
SparrowsPoint,Md. B2 ..5.30
Sterling,Ill. N15 .....5.30
Steubenville,O. W10 ....5.30
Warren,O. R2 .....5.30
Youngstown U5, Y1 .....5.30
Youngstown (27) R2 ..5.30

PLATES, Carbon Abras. Resist.
Claymont,Del. C22 ....7.05
Fontana,Calif. K1 .....7.85
Geneva,Utah C11 .....7.05
Houston S5 .....7.15
Johnstown,Pa. B2 .....7.05
SparrowsPoint,Md. B2 ..7.05

PLATES, Wrought Iron
Economy,Pa. B14 ....13.55

PLATES, H.S., L.A.
Aliquippa,Pa. J5 .....7.95
Ashland,Ky. A10 .....7.95
Bessemer,Ala. T2 .....7.95
Clairton,Pa. U5 .....7.95
Claymont,Del. C22 ....7.95
Cleveland J5, R2 .....7.95
Coatesville,Pa. L7 .....7.95
Conshohocken,Pa. A3 ..7.95
Economy,Pa. B14 .....7.95
Ecorse,Mich. G5 .....7.95
Fairfield,Ala. T2 .....7.95
Farrell,Pa. S3 .....7.95
Fontana,Calif.(30) K1 ..8.75
Gary,Ind. U5 .....7.95
Geneva,Utah C11 .....7.95
Houston S5 .....8.05
Ind.Harbor,Ind. I-2, Y1.7.95
Johnstown,Pa. B2 .....7.95
Munhall,Pa. U5 .....7.95
Pittsburgh J5 .....7.95
Seattle B3 .....8.85
Sharon,Pa. S3 .....7.95
S.Chicago,Ill. U5, W14..7.95
SparrowsPoint,Md. B2 ..7.95
Warren,O. R2 .....7.95
Youngstown U5, Y1 ....7.95

PLATES, Alloy
Aliquippa,Pa. J5 .....7.50
Claymont,Del C22 .....7.50
Coatesville,Pa. L7 .....7.50
Economy,Pa. B14 .....7.50
Farrell,Pa. S3 .....7.50
Fontana,Calif. K1 ....8.30
Gary,Ind. U5 .....7.50
Houston S5 .....7.60
Ind.Harbor,Ind. Y1 .....7.50
Johnstown,Pa. B2 .....7.50
Lowellville,O. S3 .....7.50
Munhall,Pa. U5 .....7.50
Newport,Ky. A2 .....7.50
Pittsburgh J5 .....7.50
Seattle B3 .....8.40
Sharon,Pa. S3 .....7.50
S.Chicago,Ill. U5, W14..7.50
SparrowsPoint,Md. B2 ..7.50
Youngstown Y1 .....7.50

FLOOR PLATES
Cleveland J5 .....6.375
Conshohocken,Pa. A3 ..6.375
Ind.Harbor,Ind. I-2 ..6.375
Munhall,Pa. U5 .....6.375
Pittsburgh J5 .....6.375
S.Chicago,Ill. U5 .....6.375

PLATES, Ingot Iron
Ashland c.l.(15) A10 ..5.55
Ashland l.c.l.(15) A10 ..6.05
Cleveland c.l. R2 .....6.05
Warren,O. c.l. R2 ....6.05

BARS

BARS, Hot-Rolled Carbon (Merchant Quality)
Ala.City,Ala.(9) R2 ..5.675
Aliquippa,Pa. (9) J5 ..5.675
Alton,Ill. L1 .....5.875
Atlanta (9) A11 .....5.875
Bessemer,Ala.(9) T2 ..5.675
Birmingham(9) C15 ..5.675
Buffalo(9) R2 .....5.675
Canton,O. (23) R2 .....6.15
Clairton,Pa.(9) U5 ..5.675
Cleveland(9) R2 .....5.675
Ecorse,Mich.(9) G5 ...5.675
Emeryville,Calif. J7 ...6.425
Fairfield,Ala.(9) T2 ..5.675
Fairless,Pa.(9) U5 ....5.825
Fontana,Calif.(9) K1 ..6.375
Gary,Ind.(9) U5 .....5.675
Houston(9) S5 .....5.925
Ind.Harbor(9) I-2, Y1.5.675
Johnstown,Pa.(9) B2 ..5.675
Joliet,Ill. P22 .....5.675
KansasCity,Mo.(9) S5 ..5.925
Lackawanna(9) B2 .....5.675
LosAngeles(9) B3 .....6.375
Massillon,O. (23) R2 ..6.15
Midland,Pa.(23) C18 ..6.025
Milton,Pa. M18 .....5.825
Minnequa,Colo. C10 ...6.125
Niles,Calif. P1 .....6.375
Owensboro,Ky.(9) G8 ..6.025
Pittsburg,Calif.(9) C11.6.375
Pittsburgh(9) J5 .....5.675
Portland,Oreg. O4 .....6.425
Riverdale,Ill.(9) A1 ..5.675
Seattle A24, B3 N14 ..6.425
S.Ch'c'go(9)R2,U5,W14 5.675
S.Duquesne,Pa.(9) U5 ..5.675
S.SanFran.,Calif.(9)B3 6.425
Sterling,Ill.(1)(9) N15 ..5.675
Sterling,Ill.(9) N15 ....5.775
Struthers,O.(9) Y1 .....5.675
Tonawanda,N.Y. B12 ..5.675
Torrance,Calif.(9) C11.6.375
Warren,O. C17 .....6.025
Youngstown(9) R2, U5.5.675

BARS, Hot-Rolled Alloy
Aliquippa,Pa. J5 .....6.725
Bethlehem,Pa. B2 .....6.725
Bridgeport,Conn. C32 ..6.80
Buffalo R2 .....6.725
Canton,O. R2, T7 .....6.725
Clairton,Pa. U5 .....6.725
Detroit S41 .....6.725
Economy,Pa. B14 .....6.725
Ecorse,Mich. G5 .....6.725
Fairless,Pa. U5 .....6.875
Farrell,Pa. S3 .....6.725
Fontana,Calif. K1 .....7.775
Gary,Ind. U5 .....6.725
Houston S5 .....6.975
Ind.Harbor,Ind. I-2, Y1.6.725
Johnstown,Pa. B2 .....6.725
KansasCity,Mo. S5 .....6.975
Lackawanna,N.Y. B2 ..6.725
LosAngeles B3 .....7.775
Lowellville,O. S3 .....6.725
Massillon,O. R2 .....6.725
Midland,Pa. C18 .....6.725
Owensboro,Ky. G8 .....6.725
Pittsburgh J5 .....6.725
Sharon,Pa. S3 .....6.725
S.Chicago R2, U5, W14 6.725
S.Duquesne,Pa. U5 .....6.725
Struthers,O. Y1 .....6.725
Warren,O. C17 .....6.725
Youngstown U5 .....6.725

BARS & SMALL SHAPES, H.R. High-Strength, Low-Alloy
Aliquippa,Pa. J5 .....8.30
Bessemer,Ala. T2 .....8.30
Bethlehem,Pa. B2 .....8.30
Clairton,Pa. U5 .....8.30
Cleveland R2 .....8.30
Ecorse,Mich. G5 .....8.30
FairfieldAla. T2 .....8.30
Fontana,Calif. K1 .....9.00
Gary,Ind. U5 .....8.30
Houston S5 .....8.55
Ind.Harbor,Ind. Y1 .....8.30
Johnstown,Pa. B2 .....8.30
KansasCity,Mo. S5 .....8.55
Lackawanna,N.Y. R2 ..8.30
LosAngeles B3 .....9.00
Pittsburgh J5 .....8.30
Seattle B3 .....9.05
S.Chicago,Ill. R2, W14..8.30
S.Duquesne,Pa. U5 .....8.30
S.SanFrancisco B3 ....9.05
Struthers,O. Y1 .....8.30
Youngstown U5 .....8.30

BAR SIZE ANGLES; H.R. Carbon
Bethlehem,Pa.(9) B2 ..5.825
Houston(9) S5 .....5.925
KansasCity,Mo.(9)S5 ..5.925
Lackawanna(9) B2 .....5.675
Sterling,Ill. N15 .....5.775
Sterling,Ill.(1) N15 ..5.675
Tonawanda,N.Y. B12 ..5.675

BAR SIZE ANGLES; S. Shapes
Aliquippa,Pa. J5 .....5.675
Atlanta A11 .....5.875
Joliet,Ill. P22 .....5.675
Minnequa,Colo. C10 ...6.125
Niles,Calif. P1 .....6.375
Pittsburgh J5 .....6.375
Portland,Oreg. O4 ....6.425
SanFrancisco S7 .....6.52
Seattle B3 .....6.425

BAR SHAPES, Hot-Rolled Alloy
Aliquippa,Pa. J5 .....6.80
Clairton,Pa. U5 .....6.80
Gary,Ind. U5 .....6.80
Houston S5 .....7.05
KansasCity, Mo. S5 ....7.05
Pittsburgh J5 .....6.80
Youngstown U5 .....6.80

BARS, C.F. Leaded (Including leaded extra) Carbon
LosAngeles P2, S30 ..11.75*

Alloy
Ambridge,Pa. W18 ..10.175
BeaverFalls,Pa. M12..10.175
Camden,N.J. P13 ....10.35
Chicago W18 .....10.175
Elyria,O. W8 .....10.175
Monaca,Pa. S17 .....10.175
Newark,N.J. W18 ....10.35
SpringCity,Pa. K3 ....10.35

*Grade A; add 0.05c for Grade B.

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 .....7.65
BeaverFalls,Pa. M12,R2..7.65
Birmingham C15 .....8.25
Buffalo B5 .....7.70
Camden,N.J. P13 .....8.10
Carnegie,Pa. C12 .....7.65
Chicago W18 .....7.65
Cleveland A7, C20 .....7.65
Detroit B5, P17 .....7.85
Detroit S41 .....7.65
Donora,Pa. A7 .....7.65
Elyria,O. W8 .....7.65
FranklinPark, Ill. N5 ...7.65
Gary,Ind. R2 .....7.65
GreenBay,Wis. F7 .....7.65
Hammond,Ind. J5, L2 ...7.65
Hartford,Conn. R2 .....8.15
Harvey,Ill. B5 .....7.65
LosAngeles(49) S30 .....9.10
LosAngeles(49) P2, R2..9.10
Mansfield,Mass. B5 .....8.20
Massillon,O. R2, R8 ....7.65
Midland,Pa. C18 .....7.65
Monaca,Pa. S17 .....7.65
Newark,N.J. W18 .....8.10
NewCastle,Pa.(17) B4 ..7.65
Pittsburgh J5 .....7.65
Plymouth,Mich. P5 .....7.90
Putnam,Conn. W18 .....8.20
Readville,Mass. C14 .....8.20
S.Chicago,Ill. W14 .....7.65
SpringCity,Pa. K3 .....8.10
Struthers,O. Y1 .....7.65
Warren,O. C17 .....7.65
Waukegan,Ill. A7 .....7.65
Willimantic,Conn. J5 ..8.15
Youngstown F3, Y1 ....7.65

BARS, Cold-Finished Carbon (Turned and Ground)
Cumberland,Md.(5) C19.6.55

BARS, Cold-Finished Alloy
Ambridge,Pa. W18 .....9.025
BeaverFalls,Pa.M12,R2 9.025
Bethlehem,Pa. B2 .....9.025
Bridgeport,Conn. C32 ..9.175
Buffalo B5 .....9.025
Camden,N.J. P13 .....9.20
Canton,O. T7 .....9.025
Carnegie,Pa. C12 .....9.025
Chicago W18 .....9.025
Cleveland A7, C20 .....9.025
Detroit B5, P17 .....9.225
Detroit S41 .....9.025
Donora,Pa. A7 .....9.025
Elyria,O. W8 .....9.025
FranklinPark,Ill. N5 ...9.025
Gary,Ind. R2 .....9.025
GreenBay,Wis. F7 .....9.025
Hammond,Ind. J5, L2 ...9.025
Hartford,Conn. R2 .....9.325
Harvey,Ill. B5 .....9.025
Lackawanna,N.Y. B2..9.025
LosAngeles P2, S30 ..11.00
Mansfield,Mass. B5 .....9.325
Massillon,O. R2, R8 ....9.025
Midland,Pa. C18 .....9.025
Monaca,Pa. S17 .....9.025
Newark,N.J. W18 .....9.20
Plymouth,Mich. P5 .....9.225
S.Chicago,Ill. W14 .....9.025
SpringCity,Pa. K3 .....9.20
Struthers,O. Y1 .....9.025
Warren,O. C17 .....9.025
Waukegan,Ill. A7 .....9.025
Willimantic,Conn. J5 ..9.325
Worcester,Mass. A7 ....9.375
Youngstown F3, Y1 ....9.025

BARS, Reinforcing, Billet (To Fabricators)

AlabamaCity,Ala. R2 ..5.675
Atlanta A11 .....5.675
Birmingham C15 .....5.675
Buffalo R2 .....5.675
Cleveland R2 .....5.675
Ecorse Mich. G5 .....5.675
Emeryville,Calif. J7 ...6.425
Fairfield,Ala. T2 .....5.675
Fairless,Pa. U5 .....5.825
Fontana,Calif. K1 ....6.375
Ft.Worth,Tex(4)(26)T4 5.925
Gary,Ind. U5 .....5.675
Houston S5 .....5.925
Ind Harbor,Ind. I-2, Y1 5.675
Johnstown,Pa. B2 ....5.675
Joliet,Ill. P22 .....5.675
KansasCity,Mo. S5 ...5.925
Kokomo,Ind. C16 .....5.775
Lackawanna,N.Y. B2 ..5.675
LosAngeles B3 .....6.375
Madison,Ill. L1 .....5.875
Milton,Pa. M18 .....5.825
Minnequa,Colo. C10 ..6.125
Niles,Calif. P1 .....6.375
Pittsburg,Calif. C11 ..6.375
Pittsburgh J5 .....5.675
Portland Oreg. O4 ....6.425
SandSprings,Okla. S5 ..5.925
Seattle A24, B3, N14 ..6.425
S.Chicago,Ill. R2, W14 5.675
S.Duquesne,Pa. U5 ....5.675
S.SanFrancisco B3 ....6.425
SparrowsPoint,Md. B2..5.675
Sterling,Ill.(1) N15 ...5.675
Sterling,Ill. N15 .....5.775
Struthers,O. Y1 .....5.675
Tonawanda,N. Y. B12 ..6.10
Torrance,Calif. C11 ..6.375
Youngstown R2, U5 ..5.675

BARS, Reinforcing, Billet (Fabricated: To Consumers)

Baltimore B2 .....7.42
Boston B2, U8 .....8.15
Chicago U8 .....7.41
Cleveland U8 .....7.39
Houston S5 .....7.60
Johnstown,Pa. B2 .....7.33
KansasCity,Mo. S5 ....7.60
Lackawanna,N.Y. B2 ..7.35
Marion,O. P11 .....6.70
Newark N.J. U8 .....7.80
Philadelphia U8 .....7.63
Pittsburgh J5, U8 ....7.35
SandSprings,Okla. S5 ..7.60
Seattle A24, B3, N14 ..7.95
SparrowsPt., Md. B2 ..7.33
St. Paul U8 .....8.17
Williamsport Pa. S19 ..7.25

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 14.90
Economy,Pa.(D.R.)B14 18.55
Economy(Staybolt) B14 19.00
McK Rks.(S.R.) L5 ..14.50
McK.Rks.(D.R.) L5 ..19.80
McK.Rks.(Staybolt)L5 20.95

BARS, Rail Steel

ChicagoHts.(3) C2, I-2 5.575
ChicagoHts.(4) (44) I-2 5.675
ChicagoHts.(4) C2 ....5.675
Franklin,Pa. (3) F5 ..5.575
Franklin,Pa. (4) F5 ..5.675
JerseyShore,Pa.(3) J8 ..5.55
Marion,O.(3) P11 .....5.575
Tonawanda(3) B12 ....5.575
Tonawanda(4) B12 ....6.10

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

AlabamaCity,Ala. R2 ..5.10
Allenport,Pa. P7 .....5.10
Aliquippa,Pa. J5 .....5.10
Ashland,Ky.(8) A10 ..5.10
Cleveland J5, R2 .....5.10
Conshohocken Pa. A3 ..5.15
Detroit (8) M1 .....5.10
Ecorse,Mich. G5 .....5.10
Fairfield,Ala. T2 .....5.10
Fairless,Pa. U5 .....5.15
Farrell,Pa. S3 .....5.10
Fontana,Calif. K1 ....5.825
Gary,Ind. U5 .....5.10
Geneva,Utah C11 .....5.20
GraniteCity,Ill.(8) G4 ..5.20
Ind.Harbor,Ind. I-2, Y1 5.10
Irvin,Pa. U5 .....5.10
Lackawanna,N.Y. B2 ..5.10
Mansfield,O. E6 .....5.10
Munhall,Pa. U5 .....5.10
Newport,Ky. A2 .....5.10
Niles,O. M21, S3 .....5.10
Pittsburg,Calif. C11 ....5.80
Pittsburgh J5 .....5.10
Portsmouth,O. P12 ....5.10
Riverdale,Ill. A1 .....5.10
Sharon,Pa. S3 .....5.10
S.Chicago,Ill. U5, W14 ..5.10
SparrowsPoint,Md. B2..5.10
Steubenville,O. W10 ....5.10
Warren,O. R2 .....5.10
Weirton,W.Va. W6 ....5.10
Youngstown U5, Y1 ....5.10

SHEETS, H.R. (19 Ga. & Lighter)

Niles,O. M21, S3 ....6.275

SHEETS, H.R., Alloy

Gary,Ind. U5 .....8.40
Ind.Harbor,Ind. Y1 ....8.40
Irvin,Pa. U5 .....8.40
Munhall,Pa. U5 .....8.40
Newport Ky. A2 .....8.40
Youngstown U5, Y1 ....8.40

SHEETS, H.R (14 Ga. & Heavier) High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....7.525
Ashland Ky. A10 .....7.525
Cleveland J5, R2 ....7.525
Conshohocken,Pa. A3 ..7.575
Ecorse,Mich. G5 .....7.525
Fairfield,Ala. T2 .....7.525
Fairless,Pa. U5 .....7.575
Farrell,Pa. S3 .....7.525
Fontana,Calif. K1 ....8.25
Gary,Ind. U5 .....7.525
Ind.Harbor,Ind. I-2, Y1 7.525
Irvin,Pa. U5 .....7.525
Lackawanna(35) B2 ..7.525
Munhall,Pa. U5 .....7.525
Niles,O. S3 .....7.525
Pittsburgh J5 .....7.525
S.Chicago,Ill. U5, W14 7.525
Sharon,Pa. S3 .....7.525
SparrowsPoint(36) B2..7.525
Warren,O. R2 .....7.525
Weirton,W.Va. W6 ....7.525
Youngstown U5 Y1 ..7.525

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland Ky.(8) A10 ...5.35
Cleveland R2 .....5.875
Warren,O. R2 .....5.875

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....7.05
Middletown,O. A10 ....6.775
Warren,O. R2 .....7.05

SHEETS, Cold-Rolled Steel (Commercial Quality)

AlabamaCity,Ala. R2 .6.275
Aliquippa,Pa. J5 .....6.275
Allenport,Pa. P7 .....6.275
Cleveland J5, R2 ....6.275
Conshohocken,Pa. A3..6.325
Detroit M1 .....6.275
Ecorse,Mich. G5 .....6.275
Fairfield,Ala. T2 .....6.275
Fairless,Pa. U5 .....6.325
Follansbee,W.Va. F4 ..6.275
Fontana,Calif. K1 ....7.40
Gary,Ind. U5 .....6.275
GraniteCity,Ill. G4 ....6.375
Ind.Harbor,Ind. I-2, Y1 6.275
Irvin Pa. U5 .....6.275
Lackawanna,N.Y. B2..6.275
Mansfield O. E6 .....6.275
Middletown,O. A10 ....6.275
Newport,Ky. A2 .....6.275
Pittsburg,Calif. C11 ..7.225
Pittsburgh J5 .....6.275
Portsmouth,O. P12 ....6.275
SparrowsPoint,Md. B2.6.275
Steubenville,O. W10 ..6.275
Warren,O. R2 .....6.275
Weirton,W.Va. W6 ....6.275
Yorkville,O. W10 ....6.275
Youngstown Y1 .....6.275

SHEETS, Cold-Rolled, High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....9.275
Cleveland J5, R2 .....9.275
Ecorse,Mich. G5 .....9.275
Fairless,Pa. U5 .....9.325
Fontana,Calif. K1 ....10.40
Gary,Ind. U5 .....9.275
Ind.Harbor,Ind. I-2, Y1 9.275
Lackawanna(37) B2 ..9.275
Pittsburgh J5 .....9.275
SparrowsPoint(38) B2..9.275
Warren,O. R2 .....9.275
Weirton,W.Va. W6 ....9.275
Youngstown Y1 .....9.275

SHEETS, Culvert	Cu Steel	Cu Fe
Ala.City,Ala. R2	7.225	....
Ashland,Ky. A10	7.225	7.475
Canton,O. R2	7.225	7.75
Fairfield T2	7.225	7.475
Gary,Ind. U5	7.225	7.475
GraniteCity,Ill.G4	7.325	....
Ind.Harbor I-2	7.225	7.475
Irvin,Pa. U5	7.225	7.475
Kokomo,Ind. C16	7.325	....
MartinsFry. W10	7.225	7.475
Pitts.,Calif. C11	7.975	....
Pittsburgh J5	7.225	....
SparrowsPt. B2	7.225	....

SHEETS, Culvert—Pure Iron

Ind.Harbor,Ind. I-2 ...7.475

SHEETS, Galvanized Steel Hot-Dipped

AlabamaCity,Ala. R2 .6.875‡
Ashland,Ky. A10 ....6.875†
Canton,O. R2 .....6.875‡
Dover,O. E6 .....6.875†
Fairfield,Ala. T2 ....6.875†
Gary Ind. U5 .....6.875†
GraniteCity,Ill. G4 ...6.975*
Ind.Harbor,Ind. I-2 ..6.875†
Irvin,Pa. U5 .....6.875†
Kokomo Ind. C16 ....6.975‡
MartinsFerry,O. W10 6.875*
Middletown,O. A10 ...6.875†
Pittsburg,Calif. C11 ..7.625*
Pittsburgh J5 .....6.875†
SparrowsPt.,Md. B2 ..6.875†
Warren,O. R2 .....6.875†
Weirton,W.Va. W6 ...6.875*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Well Casing

Fontana,Calif. K1 ....7.325

SHEETS, Galvanized High-Strength, Low-Alloy

Irvin,Pa. U5 .....10.125
Pittsburgh J5 .....10.125
SparrowsPt.(39) B2 ..10.025

SHEETS, Galvannealed Steel

Canton,O. R2 .....7.275
Irvin,Pa. U5 .....7.275

SHEETS, Galvanized Ingot Iron (Hot-Dipped Continuous)

Ashland,Ky. A10 ....7.125
Middletown,O. A10 ....7.125

SHEETS, Electrogalvanized

Cleveland(28) B2 .....7.65
Niles,O.(28) R2 .....7.65
Weirton,W Va. W6 ....7.50
Youngstown J5 .....7.50

SHEETS, Aluminum Coated

Butler Pa. A10 (type 1) 9.525
Bulter,Pa. A10 (type 2) 9.625

SHEETS, Enameling Iron

Ashland,Ky. A10 .....6.775
Cleveland R2 .....6.775
Fairfield,Ala. T2 ....6.775
Gary,Ind. U5 .....6.775
GraniteCity,Ill. G4 ....6.875
Ind.Harbor,Ind. I-2, Y1 6.775
Irvin,Pa. U5 .....6.775
Middletown,O. A10 ....6.775
Niles,O. M21, S3 .....6.775
Youngstown Y1 .....6.775

BLUED STOCK, 29 Gage

Dover,O. E6 .....8.70
Follansbee,W.Va. F4 ...8.70
Ind Harbor,Ind. I-2 ....8.70
Mansfield,O. E6 .....8.70
Warren,O. R2 .....8.70
Yorkville,O. W10 .....8.70

SHEETS, Long Terne, Steel (Commercial Quality)

BeechBottom W.Va.W10 7.225
Gary,Ind. U5 .....7.225
Mansfield,O. E6 .....7.225
Middletown,O. A10 ....7.225
Niles,O. M21, S3 .....7.225
Warren,O. R2 .....7.225
Weirton,W.Va. W6 ....7.225

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ....7.625

Key to Producers

A1 Acme Steel Co.
A2 Acme-Newport Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U. S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A24 Alaska Steel Mills Inc.

B1 Babcock & Wilcox
B2 Bethlehem Steel Co.
B3 Bethlehem Steel Co., Pacific Coast Div.
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div., Colo. Fuel & Iron
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C4 Carpenter Steel Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div., H. K. Porter Co. Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Plant Wickwire Spencer Steel Div., Colo. Fuel & Iron
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.
C32 Carpenter Steel ofN.Eng.

D2 Detroit Steel Corp.
D4 Disston Div., H. K. Porter Co. Inc.
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E5 Elliott Bros. Steel Co.
E6 Empire-Reeves Steel Corp.
E10 Enamel Prod. & Plating

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.
G8 Green River Steel Corp.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins Steel Tube Works
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laghlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L6 Lone Star Steel Co.
L7 Lukens Steel Co.
L8 Leschen Wire Rope Div., H. K. Porter Co. Inc.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M14 McInnes Steel Co.
M16 Md. Fine & Specialty Wire Co. Inc.
M17 Metal Forming Corp.
M18 Milton Steel Div., Merritt-Champan&Scott
M21 Mallory-Sharon Metals Corp.
M22 Mill Strip Products Co.

N1 National-Standard Co.
N2 National Supply Co.
N3 National Tube Div., U. S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 New England High Carbon Wire Co.
N8 Newman-Crosby Steel
N14 Northwest. Steel Rolling Mills Inc.
N15 Northwestern S &W Co.
N20 Neville Ferro Alloy Co.

O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Div., Detroit Steel Corp.
P13 Precision Drawn Steel
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., American Chain & Cable
P17 Plymouth Steel Corp.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.
P24 Phil. Steel & Wire Corp.

R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons John A.
R6 Rome Strip Steel Co.
R8 Reliance Div.,EatonMfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Div., Copperweld Steel Co.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.
S40 Seneca Steel Service
S41 Stainless & Strip Div., J&L Steel Corp.
S42 Southern Elec. Steel Co.
S43 Seymour Mfg. Co.
S44 Screw & Bolt Corp. of America

T2 Tenn. Coal & Iron Div., U. S. Steel Corp.
T3 Tenn. Products & Chemical Corp.
T4 Texas Steel Co.
T5 Thomas Strip Div., Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am.Rad. & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.

U3 Union Wire Rope Corp.
U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div., U. S Steel Corp.
U11 Union Carbide Metals Co.
U13 Union Steel Corp.

V2 Vanadium-Alloys Steel
V3 Vulcan-Kidd Steel Div., H. K. Porter Co.

W1 Wallace Barnes Steel Div., Associated Spring Corp.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div. Colo Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.

Y1 Youngstown Sheet&Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2 ..5.10
Allenport,Pa. P7 .....5.10
Alton,Ill. L1 .....5.30
Ashland,Ky.(8) A10 ...5.10
Atlanta A11 .....5.10
Bessemer,Ala. T2 .....5.10
Birmingham C15 .....5.10
Buffalo(27) R2 .....5.10
Conshohocken,Pa. A3 ..5.15
Detroit M1 .....5.10
Ecorse,Mich. G5 .....5.10
Fairfield Ala. T2 .....5.10
Farrell,Pa. S3 .....5.10
Fontana,Calif. K1 ....5.825
Gary,Ind. U5 .....5.10
Ind.Harbor,Ind. I-2, Y1..5.10
Johnstown,Pa.(25) B2 ..5.10
Lackaw'na,N.Y.(25) B2 5.10
LosAngeles(25) B3 ....5.85
LosAngeles C1 .....8.60
Minnequa,Colo. C10 ....6.20
Riverdale,Ill. A1 .....5.10
SanFrancisco S7 .....6.60
Seattle(25) B3 .....6.10
Seattle N14 .....6.60
Sharon,Pa. S3 .....5.10
S.Chicago,Ill. W14 .....5.10
S.SanFrancisco(25) B3 .5.85
SparrowsPoint,Md. B2 ..5.10
Torrance,Calif. C11 ....5.85
Warren,O. R2 .....5.10
Weirton,W.Va. W6 ....5.10
Youngstown U5 .....5.10

STRIP, Hot-Rolled Alloy

Carnegie,Pa. S18 .....8.40
Farrell,Pa. S3 .....8.40
Gary,Ind. U5 .....8.40
Houston S5 .....8.65
Ind.Harbor Ind. Y1 ....8.40
KansasCity,Mo. S5 .....8.65
LosAngeles B3 .....9.60
Lowellville,O. S3 .....8.40
Newport,Ky. A2 .....8.40
Sharon,Pa. A2, S3 .....8.40
S.Chicago,Ill. W14 .....8.40
Youngstown U5, Y1 ....8.40

STRIP, Hot-Rolled High-Strength, Low-Alloy

Ashland,Ky. A10 .....7.575
Bessemer,Ala. T2 .....7.575
Conshohocken,Pa. A3..7.575
Ecorse,Mich. G5 .....7.575
Fairfield,Ala. T2 .....7.575
Farrell,Pa. S3 .....7.575
Gary,Ind. U5 .....7.575
Ind.Harbor,Ind. I-2, Y1 7.575
Lackawanna,N.Y. B2 ..7.575
LosAngeles(25) B3 ....8.325
Seattle(25) B3 .....8.575
Sharon,Pa. S3 .....7.575
S.Chicago Ill. W14 ....7.575
S.SanFrancisco(25) B3..8.325
SparrowsPoint,Md. B2 ..7.575
Warren,O. R2 .....7.575
Weirton,W.Va. W6 ....7.575
Youngstown U5, Y1 ...7.575

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10 ...5.35
Warren,O. R2 .....5.875

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6 .....7.425
Baltimore T6 .....7.425
Boston T6 .....7.975
Buffalo S40 .....7.425
Cleveland A7, J5 .....7.425
Dearborn,Mich. S3 ....7.425
Detroit D2, M1, P20 ..7.425
Dover,O. G6 .....7.425
Evanston,Ill. M22 ....7.525
Farrell,Pa. S3 .....7.425
Follansbee,W.Va. W10 .7.425
Fontana,Calif. K1 .....9.20
FranklinPark,Ill. T6 ..7.525
Ind.Harbor,Ind. Y1 ....7.425
Indianapolis S41 .....7.575
LosAngeles C1 S41 ....9.30
McKeesport,Pa. E10 ..7.525
NewBedford,Mass. R10..7.875
NewBritain,Conn. S15..7.875
NewCastle,Pa. B4, E5 .7.425
NewHaven,Conn. D2 ..7.875
NewKensington,Pa. A6.7.425
Pawtucket,R.I. R3 ....7.975
Pawtucket,R.I. N8 ....7.975
Philadelphia P24 .....7.875
Pittsburgh J5 .....7.425
Riverdale,Ill. A1 .....7.525
Rome,N.Y.(32) R6 ....7.425
Sharon,Pa. S3 .....7.425
Trenton,N.J.(31) R5 ...8.875
Wallingford,Conn. W2..7.875
Warren,O. R2, T5 ....7.425
Worcester,Mass. A7 ....7.975

STRIP, Cold-Rolled Alloy

Boston T6 .....15.90
Carnegie,Pa. S18 .....15.55
Cleveland A7 .....15.55
Dover O. G6 .....15.55
Farrell,Pa. S3 .....15.55
FranklinPark,Ill. T6 ..15.55
Harrison,N.J. C18 ....15.55
Indianapolis S41 .....15.70
LosAngeles S41 .....17.75
Lowellville,O. S3 .....15.55
Pawtucket,R.I. N8 ....15.90
Riverdale,Ill. A1 .....15.55
Sharon,Pa. S3 .....15.55
Worcester,Mass. A7 ....15.85
Youngstown S41 .....15.55

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7 .....10.80
Dearborn,Mich. S3 ....10.80
Dover,O. G6 .....10.80
Farrell,Pa. S3 .....10.80
Ind.Harbor,Ind. Y1 ...10.80
Sharon,Pa. S3 .....10.80
Warren,O. R2 .....10.80

STRIP, Cold-Finished Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	9.50	10.70	12.90	15.90	18.85
Boston T6	9.50	10.70	12.90	15.90	18.85
Bristol,Conn. W1	...	10.70	12.90	16.10	19.30
Carnegie,Pa. S18	8.95	10.40	12.60	15.60	....
Cleveland A7	8.95	10.40	12.60	15.60	18.55
Dearborn,Mich. S3	9.05	10.50	12.70	....	....
Detroit D2	9.05	10.50	12.70	15.70	....
Dover,O. G6	8.95	10.40	12.60	15.60	18.55
Evanston,Ill. M22	8.95	10.40	12.60	15.60	....
Farrell,Pa. S3	8.95	10.40	12.60	15.60	18.55
Fostoria,O. S1	10.05	10.40	12.60	15.60	....
FranklinPark Ill. T6	9.05	10.40	12.60	15.60	18.55
Harrison,N.J. C18	...	...	12.90	16.10	19.30
Indianapolis S41	9.10	10.55	12.60	15.60	18.55
LosAngeles C1	11.15	12.60	14.80	17.80	....
LosAngeles S41	11.15	12.60	14.80	....	....
NewBritain,Conn. S15	9.40	10.70	12.90	15.90	18.85
NewCastle,Pa. B4, E5	8.95	10.40	12.60	15.60	....
NewHaven,Conn. D2	9.40	10.70	12.90	15.90	....
NewKensington,Pa. A6	9.85	10.40	12.60	15.60	....
NewYork W3	....	10.70	12.90	16.10	19.30
Pawtucket,R.I. N8	9.50	10.70	12.90	15.90	18.85
Riverdale,Ill. A1	9.05	10.40	12.60	15.60	18.55
Rome,N.Y.(32) R6	8.95	10.40	12.60	15.60	18.55
Sharon,Pa. S3	8.95	10.40	12.60	15.60	18.55
Trenton,N.J. R5	....	10.70	12.90	15.90	18.85
Wallingford,Conn. W2	9.40	10.70	12.90	15.90	18.75
Warren,O. T5	8.95	10.40	12.60	15.60	18.55
Worcester,Mass. A7, T6	9.50	10.70	12.90	15.90	18.85
Youngstown S41	8.95	10.40	12.60	15.60	18.55

Spring Steel (Tempered)			Up to 0.80C	0.81-1.05C	1.06-1.35C
Bristol,Conn. W1	...	...	18.85	22.95	27.80
Buffalo W12	...	...	18.85	....	....
Fostoria,O. S1	...	...	19.05	22.15	....
FranklinPark,Ill. T6	...	...	19.20	23.30	28.15
Harrison N.J. C18	...	...	18.85	22.95	27.80
NewYork W3	...	...	18.85	22.95	27.80
Palmer,Mass. W12	...	...	18.85	....	....
Trenton,N.J. R5	...	...	18.85	22.95	27.80
Worcester,Mass. A7, T6	...	...	18.85	22.95	27.80
Youngstown S41	...	...	19.20	23.30	28.15

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2 .....8.175

STRIP, C.R. Electrogalvanized

Cleveland A7 .....7.425*
Dover,O. G6 .....7.425*
Evanston,Ill. M22 ....7.525*
McKeesport Pa. E10 ..7.50*
Riverdale,Ill. A1 .....7.525*
Warren,O. B9, S3, T5.7.425*
Worcester Mass. A7 ...7.975
Youngstown S41, Y1..7.425*

*Plus galvanizing extras.

STRIP, Galvanized (Continuous)

Farrell,Pa. S3 .....7.50
Shannon,Pa. S3 .....7.50

TIGHT COOPERAGE HOOP

Atlanta A11 .....5.65
Farrell Pa. S3 .....5.525
Riverdale,Ill. A1 .....5.675
Sharon,Pa. S3 .....5.525
Youngstown U5 .....5.525

TIN MILL PRODUCTS

TIN PLATE, Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$9.10	$9.35	$9.75
Fairfield,Ala. T2	9.20	9.45	9.85
Fairless,Pa. U5	9.20	9.45	9.85
Fontana,Calif. K1	9.75	10.00	10.40
Gary,Ind. U5	9.10	9.35	9.75
GraniteCity,Ill. G4	9.20	9.45	9.60
IndianaHarbor,Ind. I-2, Y1	9.10	9.35	9.75
Irvin Pa. U5	9.10	9.35	9.75
Niles,O. R2	9.10	9.35	9.75
Pittsburg,Calif. C11	9.75	10.00	10.40
SparrowsPoint,Md. B2	9.10	9.35	9.75
Weirton,W.Va. W6	9.10	9.35	9.75
Yorkville O. W10	9.10	9.35	9.75

ELECTROLYTIC TIN-COATED SHEET (Dollars per lb)			
IndianaHarbor,Ind. Y1 (20-27 Ga.)	7.90	....	....
Niles,O. R2 (20-27 Ga.)	7.90	8.10	8.30
Aliquippa,Pa. J5 (21-27 Ga.)	7.90	8.10	....

TIN PLATE, American	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$10.40	$10.65
Fairfield,Ala. T2	10.50	10.75
Fontana,Calif. K1	11 05	11.30
Gary,Ind. U5	10.40	10.65
Ind.Harb. Y1	10.40	10.65
Irvin,Pa. U5	10.40	10.65
Pitts.,Calif. C11	11.05	11.30
Sp.Pt.,Md. B2	10.40	10.65
Weirton,W.Va. W6	10.40	10.65
Yorkville,O. W10	10.40	10.65

BLACK PLATE (Base Box)	
Aliquippa,Pa. J5	$8.20
Fairfield,Ala. T2	8.30
Fairless,Pa. U5	8.30
Fontana,Calif. K1	8.85
Gary,Ind. U5	8.20
GraniteCity,Ill. G4	8.30
Ind.Harbor Ind. I-2, Y1	8.20
Irvin,Pa. U5	8.20
Niles,O. R2	8.20
Pittsburg,Calif. C11	8.85
SparrowsPoint,Md. B2	8.20
Weirton,W.Va. W6	8.20
Yorkville,O. W10	8.20

HOLLOWARE ENAMELING Black Plate (29 Gage)	
Aliquippa,Pa. J5	7.85
Gary Ind. U5	7.85
GraniteCity.Ill. G4	7.95
Ind.Harbor,Ind. Y1	7.85
Irvin,Pa. U5	7.85
Yorkville,O. W10	7.85

MANUFACTURING TERNES (Special Coated, Base Box)	
Gary,Ind. U5	$10.05
Irvin,Pa. U5	10.05

SILICON STEEL

C.R. COILS & CUT LENGTHS (22 Ga.) Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	....	11.70	12.40	13.35	14.65
Brackenridge,Pa. A4	....	....	12.40	13.55	14.65
GraniteCity,Ill. G4	9.975*	11.30*	12.00*	13.15*	....
IndianaHarbor,Ind. I-2	9 875*	11.20*	11.90*	13.05*	....
Mansfield O. E6	9.875*	11.70	12.40	13.55	14.65
Newport,Ky. A2	9.875	11.70*	12.40*	13.55*	14.65*
Niles,O. M21	9.875*	11.70	12.40	13.55	....
Vandergrift,Pa. U5	9.875*	11 70	12 40	13.55	14.65
Warren,O. R2	9.875*	11.70	12.40	13.55	14.65
Zanesville,O. A10	....	11.70†	12.40	13.55	14.65

	Stator
Vandergrift,Pa. U5	8.10
Mansfield,O. E6	8.10
Warren,O. R2 (Silicon Lowcore)	8.10

SHEETS (22 Ga., coils & cut lengths) Fully Processed (Semiprocessed ½c lower)	T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	15.70	16.30	16.80	17.85
Vandergrift,Pa. U5	15 70	16.30	16.80	17.85
Zanesville,O. A10	15.70	16.30	16.80	17.85

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge,Pa. A4	18.10	19 70	20.20	20.70	15.70††	
Butler,Pa. A10	....	....	19.70	20.20	20.70	....
Vandergrift,Pa. U5	17.10	18.10	19.70	20.20	20.70	15.70
Warren,O. R2	....	....	....	....	....	15.70‡

*Semiprocessed. †Fully processed only. ‡Coils, annealed; semiprocessed ½c lower. ††Coils only.

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2 ..8.00
Aliquippa,Pa. J5 .....8.00
Alton,Ill. L1 .....8.20
Atlanta A1 .....8.00
Bartonville,Ill. K4 .....8.10
Buffalo W12 .....8.00
Chicago W13 .....8.00
Cleveland A7, C20 ....8.00
Crawfordsville,Ind. MS..8.10
Donora,Pa. A7 .....8.00
Duluth A7 .....8.00
Fairfield,Ala. T2 .....8.00
Fostoria,O.(24) S1 .....8.10
Houston S5 .....8.25
Jacksonville,Fla. M8 ...8.35
Johnstown,Pa. B2 .....8.00
Joliet,Ill. A7 .....8.00
KansasCity,Mo. S5 .....8.25
Kokomo,Ind. C16 .....8.10
LosAngeles B3 .....8.95
Minnequa,Colo. C10 ....8.25
Monessen,Pa. P7, P16 ..8.00
Palmer,Mass. W12 .....8.30
Pittsburg,Calif. C11 ...8.95
Portsmouth,O. P12 .....8.00
Rankin Pa. A7 .....8.00
S.Chicago,Ill. R2 .....8.00
S.SanFrancisco C10 ....8.95
SparrowsPoint,Md. B2 ..8.10
Sterling,Ill.(1) N15 ....8.00
Sterling,Ill. N15 .....8.10
Struthers,O. Y1 .....8.00
Waukegan,Ill. A7 .....8.00
Worcester,Mass. A7 ....8.30

WIRE, Cold Heading Carbon

Elyria,O. W8 .....8.00

WIRE, Gal'd., for ACSR

Bartonville,Ill. K4 ....12.65
Buffalo W12 .....13.40
Cleveland A7 .....12.65
Donora,Pa. A7 .....12.65
Duluth A7 .....12.65
Johntown,Pa. B2 .....13.40
KansasCity,Mo. U3 ...12.90
Minnequa,Colo. C10 ..12.775
Monessen,Pa. P7, P16..12.65
Muncie,Ind. I-7 .....13.60
NewHaven,Conn. A7 ..12.95
Palmer,Mass. W12 .....13.70
Pittsburg Calif. C11 ...13.45
Portsmouth,O. P12 ....12 65
Roebling N.J. R5 .....12.95
SparrowsPt.,Md. B2 ...13.50
Struthers,O. Y1 .....13.40
Trenton,N.J. A7 .....12.95
Waukegan,Ill. A7 .....12.65
Worcester,Mass. A7 ...12.95

WIRE, Upholstery Spring

Aliquippa,Pa. J5 .....9.75
Alton,Ill. L1 .....9.95
Buffalo W12 .....9.75
Cleveland A7 .....9.75
Donora,Pa. A7 .....9.75
Duluth A7 .....9.75
Johnstown,Pa. B2 .....9.75
KansasCity,Mo. S5, U3.10.00
LosAngeles B3 .....10.70
Minnequa,Colo. C10 ....9.95
Monessen,Pa. P7, P16 ..9.75
NewHaven,Conn. A7 ..10.05
Palmer,Mass. W12 .....10.05
Pittsburg Calif. C11 ...10.70
Portsmouth,O. P12 .....9.75
Roebling,N.J. R5 .....10.05
S.Chicago,Ill. R2 .....9.75
S.SanFrancisco C10 ....10.70
SparrowsPt.,Md. B2 ....9.85
Struthers,O. Y1 .....9.75
Trenton,N.J. A7 .....10.05
Waukegan,Ill. A7 .....9.75
Worcester,Mass. A7 ....10.05

WIRE, MB Spring, High-Carbon

Aliquippa,Pa. J5 .....9.75
Alton,Ill. L1 .....9.95
Bartonville,Ill. K4 ....9.85
Buffalo W12 .....9.75
Cleveland A7 .....9.75
Donora,Pa. A7 .....9.75
Duluth A7 .....9.75
Fostoria,O. S1 .....9.80
Johnstown,Pa. B2 .....9.75
KansasCity,Mo. S5, U3.10.00
LosAngeles B3 .....10.70
Milbury,Mass.(12) N6..10.05
Minnequa,Colo. C10 ....9.95
Monessen Pa. P7, P16 ..9.75
Muncie Ind. I-7 .....9.95
Palmer,Mass. W12 .....10.05
Pittsburg,Calif. C11 ...10.70
Portsmouth,O. P12 .....9.75
Roebling,N.J. R5 .....10.05
S.Chicago,Ill. R2 .....9.75
S.SanFrancisco C10 ....10.70
SparrowsPt.,Md. B2 ....9.85
Struthers,O. Y1 .....9.75
Trenton,N.J. A7 .....10.05
Waukegan,Ill. A7 .....9.75
Wor'ster,Mass.A7,J4,T6 10.05

WIRE, Fine & Weaving (8" Coils)

Alton,Ill. L1 .....16.50
Bartonville,Ill. K4 ....16.40
Chicago W13 .....16.30
Cleveland A7 .....16.30
Crawfordsville,Ind. MS.16.40
Fostoria,O. S1 .....16.30
Houston S5 .....16.55
Jacksonville,Fla. M8 ...16.65
Johnstown Pa. B2 ....16.30
KansasCity,Mo. S5 ....16.55
Kokomo,Ind. C16 .....16.30
Minnequa,Colo. C10 ....16.55
Monessen,Pa. P16 ....16.30
Muncie,Ind. I-7 .....16.50
Palmer,Mass. W12 .....16.60
S.SanFrancisco C10 ....17.15
Waukegan,Ill. A7 .....16.30
Worcester,Mass. A7, J6.16.60

WIRE, Tire Bead

Bartonville,Ill. K4 ....17.15
Monessen,Pa. P16 .....17.15
Roebling,N.J. R5 .....17.65

ROPE WIRE (A)

Bartonville,Ill. K4 ....13.45
Buffalo W12 .....13.45
Fostoria,O. S1 .....13.45
KansasCity,Mo. U3 ....13.70
Johnstown,Pa. B2 .....13.45
Monessen,Pa. P7 .....13.45
Muncie,Ind. I-7 .....13.65
Palmer Mass. W12 ....13.75
Portsmouth,O. P12 ....13.45
Roebling,N.J. R5 .....13.75
St.Louis L8 .....13.45
SparrowsPt.,Md. B2 ..13.55
Struthers,O. Y1 .....13.45
Worcester,Mass. J4 ....13.75
(A) Plow and Mild Plow; add 0.25c for Improved Plow.

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	12.35
Baltimore T6	12.65
Boston T6	12.65
Buffalo W12	12.35
Chicago W13	12.45
Cleveland A7	12.35
Crawfordsville,Ind. M8	12.35
Dover,O. G6	12.35
Farrell,Pa. S3	12.35
Fostoria,O. S1	12.35
FranklinPark,Ill. T6	12.45
Kokomo,Ind. C16	12.35
Massillon,O. R8	12.35
Milwaukee C23	12.55
Monessen,Pa. P7, P16	12.35
Palmer,Mass. W12	12.65
Pawtucket,R.I. N8	11.95
Philadelphia P24	12.65
Riverdale,Ill. A1	12.45
Rome,N.Y. R6	12.35
Sharon,Pa. S3	12.35
Trenton,N.J. R5	12.65
Warren,O. B9	12.35
Worcester,Mass. A7, T6	12.65

NAILS, Stock

	Col.
AlabamaCity,Ala. R2	173
Aliquippa,Pa. J5	173
Atlanta A11	175
Bartonville,Ill. K4	175
Chicago W13	173
Cleveland A9	173
Crawfordsville,Ind. M8	175
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	178
Jacksonville,Fla. M8	175
Johnstown,Pa. B2	173
Joliet,Ill. A7	173
KansasCity,Mo. S5	178
Kokomo,Ind. C16	175
Minnequa,Colo. C10	178
Monessen,Pa. P7	173
Pittsburg,Calif. C11	192
Rankin,Pa. A7	173
S.Chicago,Ill. R2	173
SparrowsPt.,Md. B2	175
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	179

(To Wholesalers; per cwt)

Galveston,Tex. D7	$10.30

NAILS, Cut (100 lb keg) to Distributors (33)

Wheeling,W.Va. W10	$10.10

POLISHED STAPLES

	Col.
AlabamaCity,Ala. R2	175
Aliquippa,Pa. J5	173
Atlanta A11	177
Bartonville,Ill. K4	175
Crawfordsville,Ind. M8	177
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	180
Jacksonville,Fla. M8	177
Johnstown,Pa. B2	175
Joliet,Ill. A7	173
KansasCity,Mo. S5	180
Kokomo,Ind. C16	177
Minnequa,Colo. C10	180
Pittsburg,Calif. C11	194
Rankin,Pa. A7	173
S.Chicago,Ill. R2	175
SparrowsPt.,Md. B2	177
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	181

TIE WIRE, Automatic Baler (14½ Ga.)(per 97 lb Net Box) Coil No. 3150

AlabamaCity,Ala. R2	$9.24
Atlanta A11	10.36
Bartonville,Ill. K4	9.34
Buffalo W12	10.26
Chicago W13	9.24
Crawfordsville,Ind. M8	9.34
Donora,Pa. A7	9.24
Duluth A7	9.24
Fairfield,Ala. T2	9.24
Houston S5	10.51
Jacksonville,Fla. M8	9.34
Johnstown,Pa. B2	10.26
Joliet,Ill. A7	9.24
KansasCity,Mo. S5	10.51
Kokomo,Ind. C16	9.34
LosAngeles B3	11.05
Minnequa,Colo. C10	10.51
Pittsburg,Calif. C11	9.94
S.Chicago,Ill. R2	9.24
S.SanFrancisco C10	11.04
SparrowsPt.,Md. B2	10.36
Sterling,Ill.(37) N15	9.24

Coil No. 6500 Stand.

AlabamaCity,Ala. R2	$9.54
Atlanta A11	10.70
Bartonville,Ill. K4	9.64
Buffalo W12	10.60
Chicago W13	9.54
Crawfordsville,Ind. M8	9.64
Donora,Pa. A7	9.54
Duluth A7	9.54
Fairfield,Ala. T2	9.54
Houston S5	10.85
Jacksonville,Fla. M8	9.64
Johnstown,Pa. B2	10.60
Joliet,Ill. A7	9.54
KansasCity,Mo. S5	10.85
Kokomo,Ind. C16	9.64
LosAngeles B3	11.40
Minnequa,Colo. C10	10.85
Pittsburg,Calif. C11	10.26
S.Chicago,Ill. R2	9.54
S.SanFrancisco C10	11.40
SparrowsPt.,Md. B2	10.70
Sterling,Ill.(37) N15	9.54

Coil No. 6500 Interim

AlabamaCity,Ala. R2	$9.59
Atlanta A11	10.75
Bartonville,Ill. K4	9.69
Buffalo W12	10.65
Chicago W13	9.59
Crawfordsville,Ind. M8	9.69
Donora,Pa. A7	9.59
Duluth A7	9.59
Fairfield,Ala. T2	9.59
Houston S5	10.90
Jacksonville,Fla. M8	9.69
Johnstown,Pa. B2	10.65
Joliet,Ill. A7	9.59
KansasCity,Mo. S5	10.90
Kokomo,Ind. C16	9.69
LosAngeles B3	11.45
Minnequa,Colo. C10	10.90
Pittsburg,Calif. C11	10.31
S.Chicago,Ill. R2	9.59
S.SanFrancisco C10	11.45
SparrowsPt.,Md. B2	10.75
Sterling,Ill.(37) N15	9.59

BALE TIES, Single Loop

	Col.
AlabamaCity,Ala. R2	212
Atlanta A11	214
Bartonville,Ill. K4	214
Crawfordsville,Ind. M8	214
Donora,Pa. A7	212
Duluth A7	212
Fairfield,Ala. T2	212
Houston S5	217
Jacksonville,Fla. M8	214
Joliet,Ill. A7	212
KansasCity,Mo. S5	217
Kokomo,Ind. C16	214
Minnequa,Colo. C10	217
Pittsburg,Calif. C11	236
S.SanFrancisco C10	236
SparrowsPt.,Md. B2	214
Sterling,Ill.(7) N15	214

FENCE POSTS

	Col.
Birmingham C15	177
ChicagoHts.,Ill. C2, I-2	177
Duluth A7	177
Franklin,Pa. F5	177
Johnstown,Pa. B2	177
Marion,O. P11	177
Minnequa,Colo. C10	182
Tonawanda,N.Y. B12	177

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	193**
Aliquippa,Pa. J5	190§
Atlanta A11	198§
Bartonville,Ill. K4	198
Crawfordsville,Ind. M8	198
Donora,Pa. A7	193†
Duluth A7	193†
Fairfield,Ala. T2	193†
Houston S5	198**
Jacksonville,Fla. M8	198
Johnstown,Pa. B2	196§
Joliet,Ill. A7	193†
KansasCity,Mo. S5	198**
Kokomo,Ind. C16	195†
Minnequa,Colo. C10	198**
Monessen,Pa. P7	196§
Pittsburg,Calif. C11	213†
Rankin,Pa. A7	193†
S.Chicago,Ill. R2	193**
S.SanFrancisco C10	213*
SparrowsPoint,Md. B2	198§
Sterling,Ill.(7) N15	198††

WOVEN FENCE, 9-15 Ga.

	Col.
Ala.City,Ala. R2	187**
Aliq'ppa,Pa.9-11½ga.J5	190§
Atlanta A11	192§
Bartonville,Ill. K4	192
Crawfordsville,Ind. M8	192
Donora,Pa. A7	187†
Duluth A7	187†
Fairfield,Ala. T2	187†
Houston S5	192**
Jacksonville,Fla. M8	192
Johnstown,Pa.(43) B2	190§
Joliet,Ill. A7	187†
KansasCity,Mo. S5	192**
Kokomo,Ind. C16	189†
Minnequa,Colo. C10	192**
Pittsburg,Calif. C11	210†
Rankin,Pa. A7	187†
S.Chicago,Ill. R2	187**
Sterling,Ill.(7) N15	192††

WIRE (16 gage)	An'ld Stone	Galv. Stone
Ala.City,Ala.R2	17.85	19.40**
Aliq'ppa,Pa. J5	17.85	19.65
Bartonville K4	17.95	19.80
Cleveland A7	17.85	....
Craw'dville M8	17.95	19.80‡‡
Fostoria,O. S1	18.35	19.90†
Houston S5	18.10	19.65**
Jacksonville M8	17.95	19.80‡‡
Johnstown B2	17.85	19.65§
Kan.City,Mo. S5	18.10	....
Kokomo C16	17.25	18.80†
Minnequa C10	18.10	19.65**
P'lm'r,Mass. W12	18.15	19.70†
Pitts.,Calif. C11	18.20	19.75†
S.SanFran. C10	18.20	19.75**
St'ling(37) N15	17.25	19.05††
SparrowsPt. B2	17.95	19.75§
Waukegan A7	17.85	19.40†
Worcester A7	18.15	....

WIRE, Merchant Quality

(6 to 8 gage)	An'ld	Galv.
Ala.City,Ala. R2	9.00	9.55**
Aliquippa J5	8.65	9.325§
Atlanta(48)A11	9.10	9.775§
Bartonville(48) K4	9.10	9.80
Buffalo W12	9.00	9.55†
Cleveland A7	9.00	....
Crawfordsville M8	9.10	9.80‡‡
Donora,Pa. A7	9.00	9.55†
Duluth A7	9.00	9.55†
Fairfield T2	9.00	9.55†
Houston(48) S5	9.25	9.80**
Jack'ville Fla. M8	9.10	9.80‡‡
Johnstown(48) B2	9.00	9.675§
Joliet,Ill. A7	9.00	9.55†
Kans.City(48) S5	9.25	9.80**
Kokomo(48) S16	9.10	9.65†
LosAngeles B3	9.95	10.625§
Monessen(48) P7	8.65	9.35§
Palmer,Mass. W12	9.30	9.85†
Pitts.,Calif. C11	9.95	10.50†
Rankin,Pa. A7	9.00	9.55†
S.Chicago R2	9.00	9.55**
S.SanFran. C10	9.95	10.50**
Spar'wsPt.(48)B2	9.10	9.775§
St'ling(1)(48)N15	9.00	9.70‡‡
Struthers,O. Y1	9.00	9.65†
Worcester,Mass.A7	9.30	9.85†

Based on zinc price of: *13.50, †5c, $10c, ‡Less than 10c, ††10.50c, ‡‡11.00c, **Subject to zinc equalization extras, §§11.50c.

FASTENERS

(Base discounts, shipments of one to four containers, per cent off list, f.o.b. mill)

BOLTS

Machine Bolts

Full Size Body (cut thread)

½ in. and smaller:	
3 in. and shorter	55.0
3¼ in. thru 6 in.	50.0
Longer than 6 in.	37.0
⅝ in., 3 in. & shorter	47.0
3¼ in. thru 6 in.	40.0
Longer than 6 in.	31.0
¾ in. thru 1 in.:	
6 in. and shorter	37.0
Longer than 6 in.	31.0
1¼ in. and larger:	
All lengths	31.0

Undersize Body (rolled thread)

½ in. and smaller:	
3 in. and shorter	55.0
3¼ in. thru 6 in.	50.0

Carriage Bolts

Full Size Body (cut thread) & Undersize Body (rolled thread)

½ in. and smaller:	
6 in. and shorter	48.0
Larger diameters and longer lengths	35.0

Lag, Plow, Tap, Blank, Step, Elevator, Tire, and Fitting Up Bolts

½ in. and smaller:	
6 in. and shorter	48.0
Larger diameters and longer lengths	35.0

High Tensile Structural Bolts

(Reg. semifinished hex head bolts, heavy semifinished hex nuts. Bolts — High-carbon steel, heat treated, Spec. ASTM A-325, in bulk. Full keg quantity)

⅝ in. diam	50.0
¾ in. diam	47.0
⅞ and 1 in. diam	43.0
1⅛ and 1¼ in. diam	34.0

NUTS

(Keg or case quantity and over)

Square Nuts, Reg. & Heavy:

All sizes	56.0

(Full container)

Hex Nuts, Reg. & Heavy Hot Pressed & Cold Punched:

¾ in. and smaller	62.0
⅞ in. to 1½ in., incl.	56.0
1⅝ in. and larger	51.5

Hex Nuts, Semifinished, Heavy (Incl. Slotted):

¾ in. and smaller	62.0
⅞ in. to 1½ in. incl.	56.0
1⅝ in. and larger	51.5

Hex Nuts, Finished (Incl. Slotted and Castellated):

⅞ in. and smaller	65.0
1 in. to 1½ in., incl.	57.0
1⅝ in. and larger	51.5

Semifinished Hex Nuts, Reg. (Incl. Slotted):

⅝ in. and smaller	62.0
¾ in. to ⅞ in., incl.	65.0
1 in. to 1½ in., incl.	57.0
1⅝ in. and larger	51.5

CAP AND SETSCREWS

(Base discounts, packages, per cent off list, f.o.b. mill)

Hex Head Cap Screws, Coarse or Fine Thread, Bright:

6 in. and shorter:

⅝ in. and smaller	35.0
¾, ⅞, and 1 in.	16.0
Longer than 6 in.:	
⅝ in. and smaller	3.0
¾, ⅞, and 1 in.	+11.0

High Carbon, Heat Treated:

6 in. and shorter:

⅝ in. and smaller	20.0
¾, ⅞, and 1 in.	+ 5.0

Longer than 6 in.:

⅝ in. and smaller	+19.0
¾, ⅞, and 1 in.	+39.0

Flat Head Cap Screws:

¾ in. and smaller, 6 in. and shorter + 85.0

Setscrews, Square Head, Cup Point, Coarse Thread:

Through 1 in. diam:

6 in. and shorter	+ 5.0
Longer than 6 in.	+29.0

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago and/or freight equalized with Birmingham except where equalization is too great.

Structural ½ in., larger 12.85, 7/16 in. and smaller by 6 in. and shorter: 15% off list.

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	27.24	23.13
1¼	13	....	32.25	24.41
1½	13	30.42	35.65	26.98
1⅝	13	35.94	42.12	31.89
2	13	40.28	47.21	35.74
2¼	13	45.36	53.17	40.26
2½	12	49.24	57.72	43.70
2¾	12	54.23	63.57	48.13
2½	12	58.73	68.83	52.13
3	12	62.62	73.40	55.59

RAILWAY MATERIALS

Rails	Standard No. 1	Standard No. 2	All No. 2	Tee Rails 60 lb Under
Bessemer,Pa. U5	5.75	5.60	....	6.725
Ensley,Ala. T2	5.75	5.65	....	6.725
Fairfield,Ala. T2	....	....	....	6.725
Gary,Ind. U5	5.75	5.65	....	....
Huntington,W.Va. C15	....	....	....	6.725
Johnstown,Pa. B2	....	....	....	(16)6.725
Lackawanna,N.Y. B2	5.75	5.65	....	6.725
Minnequa,Colo. C10	5.75	5.65	....	7.225
Steelton,Pa. B2	5.75	5.65	....	....
Williamsport,Pa. S19	....	....	....	6.725

TIE PLATES

Fairfield,Ala. T2	6.875
Gary,Ind. U5	6.875
Lackawanna,N.Y. B2	6.875
Minnequa,Colo. C10	6.875
Seattle B3	7.025
Steelton,Pa. B2	6.875
Torrance,Calif. C11	6.875

JOINT BARS

Bessemer,Pa. U5	7.25
Fairfield,Ala. T2	7.25
Joliet,Ill. U5	7.25
Lackawanna,N.Y. B2	7.25
Minnequa,Colo. C10	7.25
Steelton,Pa. B2	7.25

AXLES

Ind.Harbor,Ind. S13	9.125
Johnstown,Pa. B2	9.125

TRACK BOLTS, Untreated

Cleveland R2	15.35
KansasCity,Mo. S5	15.35
Lebanon,Pa. B2	15.35
Minnequa,Colo. C10	15.35
Pittsburgh S44	14.75
Seattle B3	15.85

SCREW SPIKES

Lebanon,Pa. B2	15.10

STANDARD TRACK SPIKES

Fairfield,Ala. T2	10.10
Ind.Harbor,Ind. I-2,Y1	10.10
KansasCity,Mo. S5	10.10
Lebanon,Pa. B2	10.10
Minnequa,Colo. C10	10.10
Pittsburgh J5	10.60
Seattle B3	10.60
S.Chicago,Ill. R2	10.10
Struthers,O. Y1	10.10
Youngstown R2	10.10

Footnotes

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1¼ to under 1 7/16 in.; 1 7/16 to under 1 15/16 in., 6.70c; 1 15/16 to 8 in., inclusive, 7.05c.
(6) Chicago or Birm. base.
(7) Chicago base 2 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass., base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.143 to 0.249 in.; for gage 0.142 and lighter, 5.80c.
(15) 3/8" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(21) New Haven, Conn., base.
(22) Deld. San Francisco Bay area.
(23) Special quality.
(24) Deduct 0.05c, finer than 15 Ga.
(25) Bar mills bands.
(26) Deld. in mill zone, 6.295c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝ in.; 7.375c, for widths ⅝ in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) To jobbers, deduct 20c.
(34) 9.60c or cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) Chicago base, 10 points lower.
(38) 13 Ga. & lighter; 60" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.
(41) 9.10c for cut lengths.
(42) Mill lengths, f.o.b. mill; deld. in mill zone or within switching limits, 5.635c.
(43) 9-14½ Ga.
(44) To fabricators.
(48) 6-7 Ga.
(49) 3½ in. and smaller rounds; 9.65c, over 3½ in. and other shapes.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+12.25	+27.25	+5.75	+22.5	+3.25	+20	+1.75	+18.5	+1.75	+18.5	+2	+18.75	0.5	+16.25
Ambridge, Pa. N2	+12.25	....	+5.75	....	+3.25	....	+1.75	....	+1.75	....	+2	....	0.5	....
Lorain, O. N3	+12.25	+27.25	+5.75	+22.5	+3.25	+20	+1.75	+18.5	+1.75	+18.5	+2	+18.75	0.5	+16.25
Youngstown Y1	+12.25	+27.25	+5.75	+22.5	+3.25	+20	+1.75	+18.5	+1.75	+18.5	+2	+18.75	0.5	+16.25

ELECTRIC STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown B2	+12.25	+27.25	+5.75	+22.5	+3.25	+20	+1.75	+18.5	+1.75	+18.5	+2	+18.75	0.5	+16.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅜		¼		⅝		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75
Alton, Ill. L1	....	....	....	....	....	....	0.25	+15	3.25	+11	6.75	+6.5	9.25	+5.75
Benwood, W. Va. W10	1.5	+25	+10.5	+34	+21	+42.5	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75
Butler, Pa. F6	4.5	+22	+8.5	+32	+19.5	+41	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75
Fairless, Pa. N3	....	....	....	....	....	....	0.25	+15	3.25	+11	6.75	+6.5	9.25	+5.75
Fontana, Calif. K1	....	....	....	....	....	....	+10.75	+26	+7.75	+22	+4.25	+17.5	+1.75	+16.75
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	1.25	+14	4.25	+10	7.75	+5.5	10.25	+6.25
Lorain, O. N3	....	....	....	....	....	....	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75
Sharon, Pa. S4	4.5	+22	+8.5	+32	+19.5	+41	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75
Sparrows Pt., Md. B2	2.5	+24	+10.5	+34	+21.5	+43	0.25	+15	3.25	+11	6.75	+6.5	9.25	+5.75
Wheatland, Pa. W9	4.5	+22	+8.5	+32	+19.5	+41	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75
Youngstown R2, Y1	....	....	....	....	....	....	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.72		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+2.5	3.25	+13.5	3.25	+13.5
Alton, Ill. L1	9.75	+4.75	10.25	+4.25	11.75	+4.5	11.75	+4.5	1.25	+15.5	1.25	+15.5
Benwood, W. Va. W10	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+2.5	3.25	+13.5	3.25	+13.5
Etna, Pa. N2	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+2.5	3.25	+13.5	3.25	+13.5
Fairless, Pa. N3	9.75	+4.75	10.25	+4.25	11.75	+4.5	11.75	+5.5	1.25	+15.5	1.25	+15.5
Fontana, Calif. K1	+1.25	+15.75	+0.75	+15.25	0.75	+15.5	0.75	+15.5	+9.75	+26.5	+9.75	+26.5
Indiana Harbor, Ind. Y1	10.75	+3.75	11.25	+3.25	12.75	+3.5	12.25	+3.5	2.25	+14.5	2.25	+14.5
Lorain, O. N3	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+3.5	....	....	....	....
Sharon, Pa. M6	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+2.5	....	....	....	....
Sparrows Pt., Md. B2	9.75	+4.75	10.25	+4.25	11.75	+4.5	11.75	+4.5	1.25	+15.5	1.25	+15.5
Wheatland, Pa. W9	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+2.5	3.25	+13.5	3.25	+13.5
Youngstown R2, Y1	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+2.5	3.25	+13.5	3.25	+13.5

*Galvanized pipe discounts based on price of zinc at 11.00c, East St. Louis.

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	—Rerolling— Ingot	Slabs	Forging Billets	H.R. Strip	H.R. Rods; C.F. Wire	Bars: Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	22.75	25.00	....	36.00	....	43.50	39.25	48.50	45.00
202	24.75	28.25	37.75	39.00	42.25	44.50	40.00	49.25	49.25
301	24.00	26.00	38.75	37.25	43.50	46.00	41.25	51.25	47.50
302	26.25	29.50	39.50	40.50	44.25	46.75	42.25	52.00	52.00
302B	26.50	30.75	42.25	45.75	46.75	49.00	44.50	57.00	57.00
303	....	33.25	42.50	....	47.25	49.75	45.00	56.75	56.75
304	28.00	31.25	42.00	43.75	47.00	49.50	45.75	55.00	55.00
304L	....	....	49.75	51.50	54.75	57.25	53.50	62.75	62.75
305	29.50	34.75	44.00	47.50	47.00	49.50	46.25	58.75	58.75
308	32.00	36.25	49.00	50.25	54.75	57.75	55.25	63.00	63.00
309	41.25	47.50	60.00	64.50	66.25	69.50	66.00	80.50	80.50
310	51.50	59.50	81.00	84.25	89.75	94.50	87.75	96.75	96.75
314	....	....	80.50	....	89.75	94.50	87.75	....	104.25
316	41.25	47.50	64.50	68.50	71.25	75.75	71.75	80.75	80.75
316L	....	....	72.25	76.25	79.50	83.50	79.50	88.50	88.50
317	49.75	58.00	79.75	88.25	89.50	94.25	88.50	101.00	101.00
321	33.50	38.00	48.75	53.50	54.50	57.50	54.75	65.50	65.50
330	....	....	123.25	....	113.00	143.75	135.00	149.25	149.25
18-8 CbTa	38.50	48.25	57.75	63.50	63.75	67.25	64.75	79.25	79.25
403	....	....	29.25	....	33.25	35.00	30.00	40.25	40.25
405	20.25	26.50	30.75	36.00	34.75	36.50	32.50	46.75	46.75
410	17.50	19.50	29.25	31.00	33.25	35.00	30.00	40.25	40.25
416	....	....	29.75	....	33.75	35.50	31.25	48.25	48.25
420	....	31.50	35.50	41.75	40.75	42.75	40.25	62.00	62.00
430	17.75	19.75	29.75	32.00	33.75	35.50	31.00	40.75	40.75
430F	....	....	30.50	....	34.25	36.00	31.75	51.75	51.75
431	....	29.75	39.25	....	43.50	46.00	41.00	56.00	56.00
446	....	....	40.75	59.00	46.00	48.25	42.75	70.00	70.00

Producers Are: Allegheny Ludlum Steel Corp.; American Steel & Wire Div., U. S. Steel Corp.; Anchor Drawn Steel Co., division of Vanadium-Alloys Steel Co.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; A. M. Byers Co.; Calstrip Steel Corp.; G. O. Carlson Inc.; Carpenter Steel Co.; Carpenter Steel Co. of New England; Charter Wire Products; Crucible Steel Co. of America; Damascus Tube Co.; Dearborn Div., Sharon Steel Corp.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Firth Sterling Inc.; Fort Wayne Metals Inc.; Green River Steel Corp., subsidiary of Jessop Steel Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Ellwood Ivins Steel Tube Works Inc.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Stainless & Strip Div., Jones & Laughlin Steel Corp.; Joslyn Stainless Steels, division of Joslyn Mfg. & Supply Co.; Latrobe Steel Co.; Lukens Steel Co.; Maryland Fine & Specialty Wire Co. Inc.; McLouth Steel Corp.; Metal Forming Corp.; Midvale-Heppenstall Co.; National Standard Co.; National Tube Div., U. S. Steel Corp.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Riverside-Alloy Metal Div., H. K. Porter Company Inc.; Rodney Metals Inc.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Standard Tube Co.; Superior Steel Div., Copperweld Steel Co.; Superior Tube Co.; Swepco Tube Corp.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co., subsidiary of Crucible Steel Co. of America; Tube Methods Inc.; Ulbrich Stainless Steel Inc.; Union Steel Corp.; U. S. Steel Corp.; Universal Cyclops Steel Corp.; Vanadium-Alloys Steel Co.; Wall Tube & Metal Products Co.; Wallingford Steel, subsidiary, Allegheny Ludlum Steel Corp.; Washington Steel Corp.; Seymour Mfg. Co.

Clad Steel

	Plates: 5%	Plates: Carbon Base 10%	Plates: Carbon Base 15%	Plates: Carbon Base 20%	Sheets Carbon Base 20%
Stainless					
302	....	....	....	....	37.50
304	26.05	28.80	31.55	34.30	39.75
304L	30.50	33.75	36.95	40.15	....
316	38.20	42.20	46.25	50.25	58.25
316L	42.30	46.75	51.20	55.65	....
316 Cb	49.90	55.15	60.40	65.65	....
321	31.20	34.50	37.75	41.05	47.25
347	36.90	40.80	44.65	48.55	57.00
405	22.25	24.60	26.90	29.25	....
410	20.55	22.70	24.85	27.00	....
430	21.20	23.45	25.65	27.90	....
Inconel	48.90	59.55	70.15	80.55	....
Nickel	41.65	51.95	63.30	72.70	....
Nickel, Low Carbon	41.95	52.60	63.30	74.15	....
Monel	43.35	53.55	63.80	74.05	....

	Strip, Carbon Base Cold Rolled 10%	Strip, Carbon Base Cold Rolled Both Sides
*Copper**	*$35.85*	*$42.50*

*Deoxidized. Production points: Stainless-clad ssheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4, and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Reg. Carbon (W-1)	0.330	W-Cr Hot Work (H-13)	0.550
Spec. Carbon (W-1)	0.385	W-Cr Hot Work (H-12)	0.530
Oil Hardening (O-1)	0.505	W Hot Wk. (H-21)	1.425-1.44
V-Cr Hot Work (H-11)	0.505	Hi-Carbon-Cr (D-11)	0.955

Grade by Analysis (%) W	Cr	V	Co	Mo	AISI Designation	$ per lb
18	4	1	....	....	T-1	1.840
18	4	2	....	....	T-2	2.005
13.5	4	3	....	....	T-3	2.105
18.25	4.25	1	4.75	....	T-4	2.545
18	4	2	9	....	T-5	2.915
20.25	4.25	1.6	12.95	....	T-6	4.330
13.75	3.75	2	5	....	T-8	2.485
1.5	4	1	....	8.5	M-1	1.200
6.4	4.5	1.9	....	5	M-2	1.345
6	4	3	....	6	M-3	1.590

Tool steel producers include: A4, A8, B2, B8, C4, C9, C12, C18, F2, J3, L3, M14, S8, U4, V2, and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate.

	Basic	No. 2 Foundry	Malle-able	Besse-mer
Birmingham District				
Birmingham R2	62.00	62.50**	....	....
Birmingham U6	....	62.50**	66.50	....
Woodward,Ala. W15	62.00*	62.50**	66.50	....
Cincinnati, deld.	....	70.20	....	....
Buffalo District				
Buffalo H1, R2	66.00	66.50	67.00	67.50
N.Tonawanda,N.Y. T9	....	66.50	67.00	67.50
Tonawanda,N.Y. W12	66.00	66.50	67.00	67.50
Boston, deld.	77.29	77.79	78.29	....
Rochester,N.Y., deld.	69.02	69.52	70.02	....
Syracuse,N.Y., deld.	70.12	70.62	71.12	....
Chicago District				
Chicago I-3	66.00	66.50	66.50	67.00
S.Chicago,Ill. R2	66.00	66.50	66.50	67.00
S.Chicago,Ill. W14	66.00	....	66.50	67.00
Milwaukee, deld.	69.02	69.52	69.52	70.02
Muskegon,Mich., deld.	....	74.52	74.52	....
Cleveland District				
Cleveland R2, A7	66.00	66.50	66.50	67.00
Akron,Ohio, deld.	69.52	70.02	70.02	70.52
Mid-Atlantic District				
Birdsboro,Pa. B10	68.00	68.50	69.00	69.50
Chester Pa. P4	68.00	68.50	69.00	....
Swedeland,Pa. A3	68.00	68.50	69.00	69.50
NewYork, deld.	....	75.50	76.00	....
Newark,N.J., deld.	72.69	73.19	73.69	74.19
Philadelphia, deld.	70.41	70.91	71.41	71.99
Troy,N.Y. R2	68.00	68.50	69.00	69.50
Pittsburgh District				
NevilleIsland,Pa. P6	66.00	66.50	66.50	67.00
Pittsburgh (N&S sides), Aliquippa, deld.	....	67.95	67.95	68.48
McKeesRocks,Pa., deld.	....	67.60	67.60	68.13
Lawrenceville,Homestead, Wilmerding Monaca,Pa., deld.	....	68.26	68.26	69.79
Verona,Trafford Pa., deld.	68.29	68.82	68.82	69.35
Brackenridge,Pa., deld.	68.60	69.10	69.10	69.63
Midland,Pa. C18	66.00	....	....	....
Youngstown District				
Hubbard,Ohio Y1	....	....	66.50	....
Sharpsville,Pa. S6	66.00	....	66.50	67.00
Youngstown Y1	....	....	66.50	....
Mansfield,Ohio, deld.	71.30	....	71.80	72.30
Duluth I-3	66.00	66.50	66.50	67.00
Erie,Pa. I-3	66.00	66.50	66.50	67.00
Everett,Mass. E1	67.50	68.00	68.50	....
Fontana,Calif. K1	75.00	75.50	....	....
Geneva,Utah C11	66.00	66.50	....	....
GraniteCity,Ill. G4	67.90	68.40	68.90	....
Ironton,Utah C11	66.00	66.50	....	....
Minnequa,Colo. C10	68.00	68.50	69.00	....
Rockwood,Tenn. T3	. . .	62.50‡	66.50	....
Toledo,Ohio I-3	66.00	66.50	66.50	67.00
Cincinnati, deld.	72.94	73.44	....	....

*Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.
**Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.50.
‡Phos. 0.50% up; Phos. 0.30-0.49%, $63.50.

PIG IRON DIFFERENTIALS

Silicon: Add 75 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos. iron on which base is 1.75-2.00%.

Manganese: Add 50 cents per ton for each 0.25% manganese over 1% or portion thereof.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.01-6.50% silicon; add 75c for each 0.50% silicon or portion thereof over the base grade within a range of 6.50 to 11.50%; starting with silicon over 11.50% add $1.50 per ton for each 0.50% silicon or portion thereof up to 14%; add $1 for each 0.50% Mn over 1%)

Jackson,Ohio I-3, J1	$78.00
Buffalo H1	79.25

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1.25 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

CalvertCity,Ky. P15	$99.00
NiagaraFalls,N.Y. P15	99.00
Keokuk,Iowa Open-hearth & Fdry. K2	89.00
Keokuk,Iowa O.H. & Fdry. 12½ lb piglet, 16% Si, K2	92.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Lyles,Tenn. T3 (Phos 0.035% max)	$73.00
Rockwood,Tenn. T3 (Phos. 0.035% max)	73.00
Troy N.Y. R2 (Phos. 0.035% max)	73.00
Philadelphia, deld.	81.67
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Duluth I-3 (Intermediate) (Phos. 0.036-0.075%)	71.00
Erie,Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
NevilleIsland,Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	71.00

Steel Service Center Products

Representative prices, per pound, subject to extras, f.o.b. warehouse. City delivery charges are 15 cents per 100 lb except: Denver, Moline, Norfolk, Richmond, Washington, 20 cents; Baltimore, Boston, Los Angeles, New York, Philadelphia, Portland, Spokane, San Francisco, 10 cents; Atlanta, Birmingham, Chattanooga, Houston, Seattle, no charge.

	SHEETS				STRIP	BARS			Standard Structural Shapes	PLATES	
	Hot-Rolled	Cold-Rolled	Galv. 10 Ga.†	Stainless Type 302	Hot-Rolled*	H.R. Rounds	C.F. Rds.‡	H.R. Alloy 4140††[5]		Carbon	Floor
Atlanta	8.59§	9.86§	10.13	....	8.91	9.39	13.24#	....	9.40	9.29	11.21
Baltimore	8.55	9.25	9.99	....	9.05	9.45	11.85#	15.48	9.55	9.00	10.50
Birmingham	8.18	9.45	10.46	....	8.51	8.99	....	....	9.00	8.89	10.90
Boston	10.07	11.42	11.92	53.50	12.17	10.19	13.30#	15.64	10.64	10.27	11.95
Buffalo	8.40	9.60	10.85	55.98	8.75	9.15	11.45#	15.40	9.25	9.20	10.75
Chattanooga	8.35	9.69	9.65	....	8.40	8.77	10.46	....	8.88	8.80	10.66
Chicago	8.25	9.45	10.90	53.00	8.51	8.99	9.15	15.05	9.00	8.89	10.20
Cincinnati	8.43	9.51	10.95	53.43	8.83	9.31	11.58#	15.37	9.56	9.27	10.53
Cleveland	8.36	9.54	11.00	52.33	8.63	9.10	11.25#	15.16	9.39	9.13	10.44
Dallas	8.80	9.30	....	....	8.85	8.80	....	....	8.75	9.15	10.40
Denver	9.40	11.84	12.94	....	9.43	9.80	11.19	....	9.84	9.76	11.08
Detroit	8.51	9.71	11.25	56.50	8.88	9.30	9.51	15.33	9.56	9.26	10.46
Erie, Pa.	8.35	9.45	9.95[10]	....	8.60	9.10	11.25	....	9.35	9.10	10.60
Houston	8.40	8.90	10.29	52.00	8.45	8.40	11.60	15.75	8.35	8.75	10.10
Jackson, Miss.	8.52	9.79	....	....	8.84	9.82	10.68	....	9.33	9.22	11.03
Los Angeles	8.70[2]	10.80[2]	12.20	57.60	9.15	9.10[2]	12.95[2]	16.35	9.00[2]	9.10[2]	11.30[2]
Memphis, Tenn.	8.59	9.80	....	....	8.84	9.32	11.25#	....	9.33	9.22	10.86
Milwaukee	8.39	9.59	11.04	....	8.65	9.13	9.39	15.19	9.22	9.03	10.34
Moline, Ill.	8.55	9.80	....	....	8.84	8.95	9.15	....	8.99	8.91	....
New Lork	9.17	10.49	11.30	53.08	9.64	9.99	13.25#	15.50	9.74	9.77	11.05
Norfolk, Va.	8.65	....	....	....	9.15	9.30	12.75	....	9.65	9.10	10.50
Philadelphia	8.20	9.55	10.61	52.71	9.25	9.40	11.95#	15.48	9.10	9.15	10.40**
Pittsburgh	8.35	9.55	10.90	52.00	8.61	8.99	11.25#	15.05	9.00	8.89	10.20
Richmond, Va.	8.65	....	10.79	....	9.15	9.55	....	....	9.65	9.10	10.60
St. Louis	8.63	9.83	11.28	....	8.89	9.37	9.78	15.43	9.48	9.27	10.58
St. Paul	8.79	10.04	11.49	....	8.84	9.21	9.86	....	9.38	9.30	10.49
San Francisco	9.65	11.10	11.40	55.10	9.75	10.15	13.60	16.25	9.85	10.00	12.35
Seattle	10.30	11.55	12.50	56.52	10.25	10.50	14.70	16.80[3]	10.20	10.10	12.50
South'ton, Conn.	9.07	10.33	10.71	....	9.48	9.74	....	....	9.57	9.57	10.91
Spokane	10.30	11.55	12.50	57.38	10.75	11.00	14.70	16.80	10.20	10.10	13.00
Washington	9.15	....	....	....	9.65	10.05	12.50	....	10.15	9.60	11.10

*Prices do not include gage extras; †prices include gage and coating extras; ‡includes 35-cent bar quality extras; §42 in. and under; **⅛ in. and heavier; ††as annealed; ‡‡¾ in. to 4 in. wide, inclusive; #net price. 1 in. round C-1018.

Base quantities, 2000 to 4999 lb except as noted; cold-finished bars, 2000 lb and over except in Seattle, 2000 to 3999 lb; stainless sheets, 8000 lb except in Chicago, New York, Boston, Seattle, 10,000 lb and in San Francisco, 2000 to 4999 lb; hot-rolled products on West Coast, 2000 to 9999 lb, except in Seattle, 30,000 lb and over; [2]—30,000 lb; [3]—1000 to 4999 lb; [5]—1000 to 1999 lb; [10]—2000 lb and over.

Refractories

Fire Clay Brick (per 1000 pieces*)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchens, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Winburne, Snow Shoe, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parrall, Portsmouth, Ohio, Ottawa, Ill., Stevens Pottery, Ga., Canon City, Colo., $140; Salina, Pa., $145; Niles, Ohio, $138; Cutler, Utah. $175.

Super-Duty: Ironton, Ohio, Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Winburne, Snow Shoe, Pa., New Savage, Md., St. Louis, $185; Stevens Pottery, Ga., $195; Cutler, Utah, $248.

Silica Brick (per 1000 pieces*)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Pt. Matilda, Pa., Portsmouth, Ohio, Hawstone, Pa., St. Louis, $158; Warren, Niles, Windham, Ohio, Hays, Latrobe, Morrisville, Pa., $163; E. Chicago, Ind., Joliet, Rockdale, Ill., $168; Canon City, Colo., $173; Lehi, Utah, $183; Los Angeles, $185.

Super-Duty: Sproul, Hawstone, Pa., Niles, Warren, Windham, Ohio, Leslie, Md., Athens, Tex., $158; Morrisville, Hays, Latrobe, Pa., $163; E. Chicago, Ind., St. Louis, $168; Canon City, Colo., $183; Curtner, Calif., $185.

Semisilica Brick (per 1000 pieces*)

Woodbridge, N. J., Canon City, Colo., $140; Philadelphia, Clearfield, Pa. $145.

Ladle Brick (per 1000 pieces*)

Dry Pressed: Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Vanport, Pa., Mexico, Vandalia, Mo., Wellsville, Irondale, New Salisbury, Ohio, $96.75; Clearfield, Pa., Portsmouth, Ohio, $102.

High-Alumina Brick (per 1000 pieces*)

50 Per Cent: St. Louis, Mexico, Vandalia, Mo., Danville, Ill., $253; Philadelphia, $265; Clearfield, Pa., $230; Orviston, Snow Shoe, Pa., $260.

60 Per Cent: St. Louis, Mexico, Vandalia, Mo., $310; Danville, Ill., $313; Clearfield, Orviston, Snow Shoe, Pa., $320; Philadelphia, $325.

70 Per Cent: St. Louis, Mexico, Vandalia, Mo., $350; Danville, Ill., $353; Clearfield, Orviston, Snow Shoe, Pa., $360; Philadelphia, $365.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., St. Louis, $188; Ottawa, Ill., $205.

Nozzles (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., St. Louis, $310.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., $234.

Dolomite (per net ton)

Domestic, dead-burned, bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, Gibsonburg, Narlo, Ohio, $16.75; Thornton, McCook, Ill., $17; Dolly Siding, Bonne Terre, Mo., $15.60.

Magnesite (per net ton)

Domestic, dead-burned, ½ in. grains with fines: Chewelah, Wash., Luning, Nev., $46; ¾ in. grains with fines: Baltimore, $73.

*—9 in. x 4½ x 2.50 sts.

Fluorspar

Metallurgical grades, f.o.b. shipping point in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $37-$41; 70%, $36-$40; 60%, $33-$36.50. Imported, net ton, f.o.b. cars point of entry, duty paid, metallurgical grade; European, $30-$33, contract; Mexican, all rail, duty paid, $25; barge, Brownsville, Tex., $27.

Ores

Lake Superior Iron Ore

(Prices effective at start of the 1959 shipping season, subject to later revision, gross ton, 51.50% iron natural, rail of vessel, lower lake ports.)

Mesabi bessemer	$11.60
Mesabi nonbessemer	11.45
Old Range bessemer	11.85
Old Range nonbessemer	11.70
Open-hearth lump	12.70
High phos	11.45

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Jan. 1, 1959, and increases or decreases after that date are absorbed by the seller.

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

New Jersey, concentrates	nom.

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 65%	21.00
Brazilian iron ore, 68.5%	22.60

Tungsten Ore

Net ton, unit

Foreign wolframite, good commercial quality	$12.50-13.00*
Domestic, concentrates f.o.b. milling points	16.00-17.00†

*Before duty. †Nominal.

Manganese Ore

Mn 46-48%, Indian 91.5c-96.5c, nom. per long ton unit, c.i.f. U. S. ports, duty for buyer's account.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and Rhodesian

48% 3:1	$42.00-44.00†
48% 2.8:1	38.00-40.00†
48% no ratio	2[illegible] 00-31.00†

South African Transvaal

44% no ratio	19.75-21.00
48% no ratio	29.00-31.00

Turkish

48% 3:1	51.00-55.00†

Domestic

Rail nearest seller

18% 3:1	39.00

Molybdenum

Sulfide concentrate, per lb of Mo content, mines, unpacked	$1.23

Antimony Ore

Per short ton unit of Sb content, c.i.f. seaboard

50-55%	$2.25-2.40
60-65%	2.50-3.10

Vanadium Ore

Cents per lb V_2O_5

Domestic	31.00

†Nominal.

Electrodes

Threaded with nipple; unboxed, f.o.b. plant

GRAPHITE

Inches Diam	Inches Length	Per 100 lb
2	24	$64.00
2½	30	41.50
3	40	39.25
4	40	37.00
5½	40	36.50
6	60	33.25
7	60	29.75
8, 9, 10	60	29.50
12	72	28.25
14	60	28.25
16	72	27.25
17	60	27.25
18	72	27.00
20	72	26.50
24	84	27.25

CARBON

8	60	14.25
10	60	13.80
12	60	14.75
14	60	14.75
14	72	12.55
17	60	12.65
17	72	12.10
20	90	11.55
24	72, 84	11.95
24	96	12.10
30	84	12.00
35, 40	110	11.60
40	100	12.50

Metal Powder

(Per pound f.o.b. shipping point in ton lots for minus 100 mesh, except as noted)

	Cents
Sponge Iron, domestic and foreign, 98% Fe, min. truckiots, freight allowed east of Mississippi River:	
100 mesh, bags	11.25
100 mesh, pails	9.10‡
40 mesh, bags	8.10††
Electrolytic Iron,	
Melting stock, 99.87% Fe, irreg. fragments, ⅛ in. x 1.3 in.	28.75
1.3 in.	28.75
(In contract lots of 240 tons price is 22.75c)	
Annealed, 99.5% Fe	36.50
Unannealed (99+% Fe)	36.00
Unannealed (99+% Fe) (minus 325 mesh)	59.00
Powder Flake (minus 16 plus 100 mesh)	29.00
Carbonyl Iron: 98.1-98.9%, 3 to 20 microns, depending on grade, 93.00-290.00 in standard 200-lb containers; all minus 200 mesh.	
Aluminum: Atomized, 500-lb drum, freight allowed, c.l. 38.50; ton lots 40.50	
Antimony, 500-lb lots	42.00*
Brass, 5000-lb lots	33.30-49.50†
Bronze, 5000-lb lots	50.50-54.60†
Copper, electrolytic	14.25*
Copper, reduced	14.25*
Lead	7.50*
Manganese, Electrolytic: Minus 50 mesh	43.00
Nickel	80.60
Nickel-Silver, 5000-lb lots	51.50-56.00†
Phosphor-Copper, 5000-lb lots	62.80
Copper (atomized) 5000-lb lots	43.30
Solder	7.00*
Stainless Steel, 304	$0.89
Stainless Steel, 316	$1.07
Tin	14.00*
Zinc, 5000-lb lots	19.00-32.20‡
Tungsten: Carbon reduced, 98.8% min, minus 65 mesh	Dollars nom**
Chromium, electrolytic 99.8% Cr, min metallic basis	5.00

*Plus cost of metal. †Depending on composition. ‡Depending on mesh. §Cutting and scrafing grade. **Depending on price of ore. ††Welding grade.

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, Pa., furnace	$14.75-15.25
Connellsville, Pa., foundry	18.00-18.50

Oven Foundry Coke

Birmingham, ovens	$30.35
Cincinnati, deld.	33.34
Buffalo, ovens	32.00
Detroit, ovens	32.00
Pontiac, Mich., deld.	33.95
Saginaw, Mich., deld.	35.53
Erie, Pa., ovens	32.00
Everett, Mass., ovens: New England, deld.	33.55*
Indianapolis, ovens	31.25
Ironton, Ohio, ovens	30.50
Cincinnati, deld.	33.54
Kearny, N. J., ovens	31.25
Milwaukee, ovens	32.00
Neville Island (Pittsburgh), Pa., ovens	30.75
Painesville, Ohio, ovens	32.00
Cleveland, deld.	34.19
Philadelphia, ovens	31.00
St. Louis, ovens	33.00
St. Paul, ovens	31.25
Chicago, deld.	*34.68*
Swedeland, Pa., ovens	31.00
Terre Haute, Ind., ovens	31.25

*Within $5.15 freight zone from works.

Imported Steel

(Base per 100 lb, landed, duty paid; based on current ocean rates with any rise for buyer's acc't. Source of shipment: Western Europe)

	North Atlantic	Great Lakes	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305	$6.03	$6.03	$5.98	$5.88	$6.34
Bar Size Angles	6.03	6.03	5.98	5.88	6.34
Structural Angles	5.93	5.93	5.88	5.78	6.18
I-Beams	5.93	5.93	5.88	5.78	6.18
Channels	5.93	5.93	5.88	5.78	6.18
Plates (basic bessemer)	5.70	5.70	5.65	5.55	5.95
Sheets, H.R.	7.00	7.00	6.95	6.85	7.25
Sheets, Galvanized, 20 Ga., 36 in. x 96 in.	9.30	9.30	9.25	9.15	9.65
Sheets, Galv. (in coils) 20 Ga., 48 in. wide	9.45	9.45	9.40	9.30	9.70
Sheets, C.R. (drawing quality)	8.50	8.50	8.45	8.35	8.75
Furring Channels, C.R., 1000 ft, ¾ x 0.30 lb per ft	25.22	25.06	24.91	24.61	26.28
Barbed Wire (†)	7.15	7.15	7.10	7.00	7.40
Merchant Bars	6.08	6.08	6.03	5.93	6.33
Hot-Rolled Bands	6.00	6.00	5.95	5.85	6.25
Wire Rods, Thomas Commercial No. 5	6.10	6.15	6.10	6.00	6.35
Wire Rods, O.H.	6.65	6.70	6.65	6.55	6.90
Bright Common Wire Nails (§)	7.65	7.65	7.60	7.50	7.90

†Per 82 lb net reel. §Per 100-lb kegs, 20d nails and heavier.

Coal Chemicals

(Representative prices)

Cents per gal f.o.b. tank cars or tank trucks, plant.	
Pure benzene	31.00
Xylene, industrial grade	29.00
Creosote	24.00
Naphthalene, 78 deg	5.00
Toluene, one deg (del. east of Rockies)	25.00
Cents per lb, f.o.b. tank cars or tank trucks, deld.	
Phenol, 90 per cent grade	14.75
Per net ton bulk, f.o.b. cars or trucks, plant	
Ammonium sulfate, regular grade	$32.00

Ferroalloys

MANGANESE ALLOYS

Spiegeleisen: Carlot, per gross ton, Palmerton, Neville Island, Pa. 21-23% Mn, $105; 19-21% Mn, 1-3% Si, $102.50; 16-19% Mn, $100.50.

Standard Ferromanganese: (Mn 74-76%, C 7% approx) base price per net ton, $245, Johnstown, Duquesne, Sheridan, Neville Island, Pa.; Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. Add or subtract $2 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively (Mn 79-81%). Lump $253 per net ton, f.o.b. Anaconda or Great Falls, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%, fractions in proportion to nearest 0.1%.

High-Grade Low-Carbon Ferromanganese: (Mn 85-95%). Carload, lump, bulk, max 0.07% C, 35.1c per lb of contained Mn, carload packed 36.4c, ton lots 37.9c, less ton 39.1c. Delivered. Deduct 1.5c for max 0.15% C grade from above prices, 3c for max 0.03% C, 3.5c for max 0.5% C, and 6.5c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk, 25.5c per lb of contained Mn; packed, carload 26.8c, ton lot 28.4c, less ton 29.6c.

Electrolytic Manganese Metal: Min carload, bulk, 33.25c; 2000 lb to min carload, 36c; less ton, 38c; 50 lb cans, add 0.5c per lb. Premium for hydrogen-removed metal, 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or any point east of Mississippi River; or f.o.b. Marietta, O., freight allowed.

Silicomanganese: (Mn 65-68%). Carload, lump, bulk, 1.50% C grade, 18.5-21% Si, 12.8c per lb of alloy. Packed, c.l. 14c, ton 14.45c, less ton 15.45c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. For 2% C grade, Si 16-18.5%, deduct 0.2c from above prices. For 3% grade, Si 12.5-16%, deduct 0.4c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lot, 2" x D, $1.50 per lb of contained Ti; less ton to 300 lb, $1.55. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lot $1.35, less ton to 300 lb $1.37, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract min c.l. $250 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi River and north of Baltimore and St. Louis. Spot, $255.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4%). Contract, c.l. $300 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed. Spot, $305.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: C.l. lump, bulk, 28.75c per lb of contained Cr. Delivered.

Charge Chrome 1: Cr 63%, C 6% max, Si 7% max, 22c. **Charge Chrome 2:** Cr 50-59%, C 8% max, Si 6% max, 23c. Carload, lump, bulk, per lb Cr.

Refined Chrome 1: Cr 50-59%, C 5% max, Si 2% max, 25c. **Refined Chrome 2:** Si 12% max, 24c. Carload, lump, bulk, per lb Cr.

Low-Carbon Ferrochrome: Cr 63-66% (Simplex), carload, lump, bulk, C 0.025% max, 36.75c per lb contained Cr; 0.010% max, 37.75c. Delivered.

Cr 67-71%, carload, lump, bulk, 0.025% max, 39.75c; 0.05% max, 39.00c; 0.10% max, 38.50c; 0.20% max, 38.25c; 0.50% max, 38.00c; 1.0% max, 37.75c; 1.5% max, 37.50c; 2.0% max, 37.25c. Delivered.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%, Si 7-10%). C.l., 2" x D, bulk 30.8c per lb of contained Cr. Packed, c.l. 32.4c, ton 34.2c, less ton 35.7c. Delivered. Spot, add 0.25c.

Foundry Ferrosilicon Chrome: (Cr 50-54%, Si 28-32%, C 1.25% max), 8M x D, carload, bulk, 20.05c per lb of alloy, carload packed, 21.25c, ton lot 22.50c, less ton lot 23.70c. Delivered. Spot, add 0.25c.

Ferrochrome-Silicon: Cr 39-41%, Si 42-45%, C 0.05% max or Cr 33-36%, Si 45-48%, C 0.05% max. Carload, lump, bulk, 3" x down and 2" x down, 28.25c per lb contained Cr, 14.60c per lb contained Si, 0.75" x down 29. 40c per lb contained Cr, 14.60c per lb contained Si.

Chromium Metal, Electrolytic: Commercial grade (Cr 99.8% min, metallic basis, Fe 0.2% max). Contract, carlot, packed, 2" x D plate (about ⅛" thick) $1.15 per lb, ton lot $1.17, less ton lot $1.19. Delivered. Spot, add 5c.

VANADIUM ALLOYS

Ferrovanadium: Open-hearth grade (V 50-55%, Si 8% max, C 3% max). Contract, any quantity, $3.20 per lb of contained V. Delivered. Spot, add 10c. **Special Grade:** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.30. **High Speed Grade:** (V 50-55% or 70-75%, Si 1.50% max, C 0.20% max) $3.40.

Grainal: Vanadium Grainal No. 1 $1.05 per lb; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lot, packed, $1.38 per lb contained V_2O_5, freight allowed. Spot, add 5c.

SILICON ALLOYS

50% Ferrosilicon: Carload, lump, bulk, 14.6c per lb contained Si. Packed, c.l. 17.1c, ton lot 18.55c, less ton 20.20c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Keokuk, Iowa; Portland, Oreg. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.45c to 50% ferrosilicon prices.

65% Ferrosilicon: Carload, lump, bulk, 15.75c per lb contained silicon. Packed, c.l. 17.75c, ton lot 19.55c, less ton 20.9c. Delivered. Spot, add 0.35c.

75% Ferrosilicon: Carload, lump, bulk, 16.9c per lb of contained Si. Packed, c.l. 18.8c, ton lot 20.45c, less ton 21.7c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Carload, lump, bulk, 20c per lb of contained Si. Packed, c.l. 21.65c, ton lot 23.05c, less ton 24.1c. Delivered. Spot, add 0.25.

Silicon Metal: (98% min Si, 1.00% max Fe, 0.07% max Ca). C.l. lump, bulk, 21.5c per lb of Si. Packed, c.l. 23.15c, ton lot 24.45c, less ton 25.45c. Add 0.5c for max 0.03% Ca grade. Add 0.5c for 0.50% Fe grade analyzing 98.25% min Si.

Alsifer: (Approx 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls N. Y., lump, carload, bulk, 9.85c per lb of alloy; ton lot, packed, 10.85c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, C 0.20% max). Contract, c.l., lump, bulk, 9.25c per lb of alloy. Packed, c.l. 10.45c, ton lot 11.6c, less ton 12.45c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Carload, bulk 26.25c per lb of alloy, carload, lump, packed 27.25c, ton lot 28.4c, less ton 29.65c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: 100 lb or more packed (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy; less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices, 100 lb and over are as follows: Grade A (10-14% B) 85c per lb; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). Carload, bulk, lump, or 3" x D, $5.25 per lb of contained B. Packed, carload $5.40, ton to c.l. $5.50, less ton $5.60. Delivered.

Carbortam: (B 1 to 2%). Lump, carload $320 per ton, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Carload, lump, bulk 23c per lb of alloy, carload packed 24.25c, ton lot 26.15c, less ton 27.15c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.5-3%). Carload, lump, bulk 24c per lb of alloy, carload packed 25.65c, ton lot 27.95c, less ton 29.45c. Delivered. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx 3¾ lb each and containing 2 lb of Cr). Carload, bulk 19.60c per lb of briquet, in bags 20.70c; 3000 lb to c.l. pallets 20.80c; 2000 lb to c.l. in bags 21.90c; less than 2000 lb in bags 22.80c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx 3 lb and containing 2 lb of Mn). Carload, bulk 14.8c per lb of briquet; c.l., packed, bags 16c; 3000 lb to c.l., pallets 16c; 2000 lb to c.l., bags 17.2c; less ton 18.1c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx 3½ lb and containing 2 lb of Mn and approx ½ lb of Si). C.l. bulk 15.1c per lb of briquet; c.l. packed, bags 16.3c, 3000 lb to c.l., pallets 16.3c; 2000 lb to c.l., bags 17.5c; less ton 18.4c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx 5 lb and containing 2 lb of Si and small sizes, weighing approx 2½ lb and containing 1 lb of Si). Carload, bulk 8c per lb or briquet; packed, bags 9.2c; 3000 lb to c.l., pallets 9.6c; 2000 lb to c.l.; bags 10.8c; less ton 11.7c. Delivered. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each). $1.49 per lb of Mo contained, f.o.b. Langeloth, Pa.

Titanium Briquets: Ti 98.27%, $1 per lb f.o.b. Niagara Falls, N. Y.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%). 5000 lb W or more $2.15 per lb (nominal) of contained W. Delivered.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 8% max, C 0.1% max). Ton lots 2" x D, $3.45 per lb of contained Cb; less ton lots $3.50 (nominal). Delivered.

Ferrotantalum Columbium: (Cb 40% approx, Ta 20% approx, and Cb plus Ta 60% min, C 0.30% max). Ton lots 2" x D, $3.05 per lb of contained Cb plus Ta, delivered; less ton lots $3.10.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx). Carlot bulk 19.25c per lb of alloy, c.l. packed ½ in. x 12 M 20.00c, ton lot 21.15c, less ton 22.40c. Delivered. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 20c per lb of alloy, ton lot 21.15c; less ton lot 22.4c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

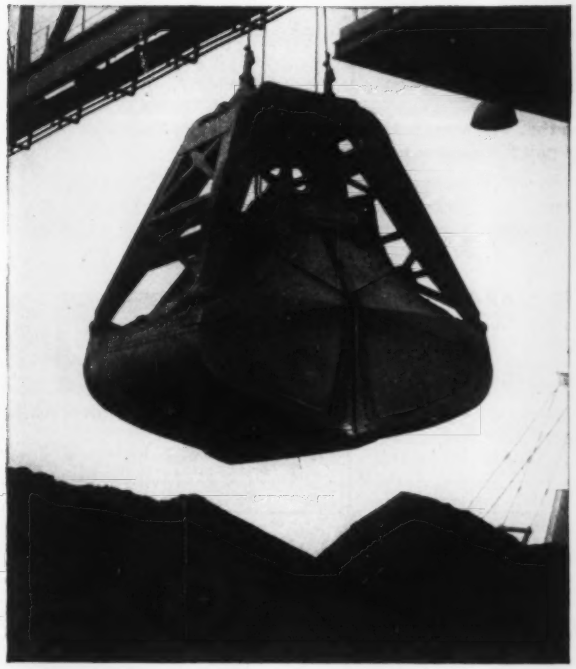
V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 18.45c per lb of alloy; ton lot 19.95c; less ton lot 21.20c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Simanal: (Approx 20% each Si, Mn, Al; bal Fe). Lump, carload, bulk 19.25c. Packed c.l. 20.25c, 2000 lb to c.l. 21.25c; less than 2000 lb 21.75c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $5 for each 1% of P above or below the base). Carload, bulk, f.o.b. sellers' works, Mt. Pleasant, Siglo, Tenn., $120 per gross ton.

Ferromolybdenum: (55-75%). Per lb of contained Mo in 200-lb container, f.o.b. Langeloth and Washington, Pa., $1.76 in all sizes except powdered which is $1.82.

Technical Molybdic-Oxide: Per lb of contained Mo., in cans, $1.47; in bags, $1.46, f.o.b. Langeloth and Washington, Pa.



The Big Bite from Blaw-Knox... 680 cubic feet at one time

Custom-built at Blaw-Knox this huge clamshell bucket lifts enough coal in one bite to heat a seven room house located in a northern climate for a period of two years.

This four-rope, geared hinge, corner bar type clamshell is the largest of more than 400 varieties produced by Blaw-Knox that can be shipped completely assembled. Larger buckets must be delivered in sub-assemblies.

Capacity for any job has become a custom with Blaw-Knox. Every day, buckets designed and built at Blaw-Knox are performing profitably on the "tough" jobs all over the world.

A Blaw-Knox Bucket Engineer will be glad to help you select the bucket best suited to your operation. Contact him today or write for your copy of Blaw-Knox Bulletin number 2392.

BLAW-KNOX COMPANY

Blaw-Knox Equipment Division
Pittsburgh 38, Pennsylvania

BLAW-KNOX

MODERN ELECTROPLATING

By ALLEN G. GRAY

563 pages • 64 illustrations

A fundamental work drawing on the experience of a group of leading authorities. MODERN ELECTROPLATING provides a complete one-volume summary of current plating practices. The only work to emphasize the practical aspects of the science as well as the basic theory on which the applications rest. It reflects the numerous developments in electro-depositing which have made electroplating indispensable in both utility and decorative arts.

PRICE $9.50 POSTPAID

THE PENTON PUBLISHING CO.
Book Dept. 1213 W. 3rd St.
Cleveland 13, Ohio

DYKEM STEEL BLUE

Stops Losses making Dies and Templates

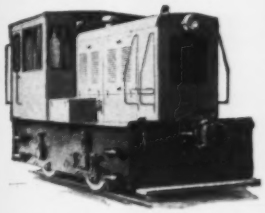
Popular package is 8-oz. can fitted with Bakelite cap holding soft-hair brush for applying right at bench; metal surface ready for layout in a few minutes. The dark blue background makes the scribed lines show up in sharp relief, prevents metal glare. Increases efficiency and accuracy.

Write for sample on company letterhead

THE DYKEM COMPANY
2303H North 11th St. • St. Louis 6, Mo.

Choose Any Type or Make of Engine

ROGERS INDUSTRIAL LOCOMOTIVES



Choose any of the standard diesel or gasoline engines. Your Rogers Locomotive will be so equipped with proven matching components.

Smooth, rapid acceleration and high, continuous tractive effort over the entire range will be assured. Shifting will be automatic.

Convenient controls that are safe and responsive allow ease of operation even to unskilled operators.

5 ton to 40 ton units for conventional or special requirements.

Write for literature.

ROGERS BROTHERS CORPORATION
ALBION, PENNA.

Export Office: 50 CHURCH ST., NEW YORK 7, N. Y., U.S.A.
Cable Address: ROGLOCO

STOP COSTLY CORROSION

in underground systems and structures with *Harco* CATHODIC PROTECTION

If you have buried or submerged metal structures (pipe lines, oil and water storage tanks, etc.) CORROSION is costing you money!

The corrosion can be stopped. Not by magic . . . but by the application of a specially designed cathodic protection system that will reverse the process of corrosion. This system will pay for itself many times over.

Harco will provide you with the facts. They will provide the necessary testing, drawings, materials . . . and installation. It costs you nothing to check with HARCO engineers. Write or phone today . . .

THE HARCO CORPORATION
4595 East 71st Street • Cleveland 25, Ohio
VUlcan 3-8787

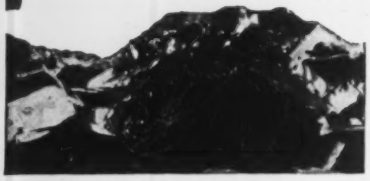
Harco
CATHODIC PROTECTION DIVISION

8482-HC

Dow Magnesium anodes • National Carbon graphite anodes • Duriron anodes • Rectifiers • Cadweld brazing equipment • Polyken tape . . . and other materials.

HANDLE MORE SCRAP *FASTER* with OWEN SCRAP GRAPPLES

Learn the reasons why OWEN GRAPPLES are MORE EFFICIENT... MORE ECONOMICAL.



Write for our Illustrated Catalog today!

The OWEN BUCKET CO. • BREAKWATER AVE. • CLEVELAND 2, OHIO
Branches: New York, Philadelphia, Chicago, Berkeley, Calif., Ft. Lauderdale, Fla.
Manufacturers of OWEN CLAMSHELL BUCKETS

If METALWORKING PLANTS ARE YOUR PROSPECTS...

✔ ✔ ✔

STEEL can put you in touch with the important ones, those that do more than 92% of the industry's business. Tell the buyers and specifiers in these plants of the machines or materials you have for sale through an "Equipment—Materials" advertisement. For rates write STEEL, Penton Building, Cleveland 13, O.

Scrap Prices Hold on Light Sales

STEEL's composite on No. 1 heavy melting grade is unchanged at $38.33. Substantial tonnages are being booked for delivery after settlement of strike. Brokers continue bullish

Scrap Prices, Page 152

• **Pittsburgh**—Prices are firm in a dull market. No. 1 heavy melting scrap is quoted $38 to $39 on the basis of the last sale, but consumers can't pick up much at that price. Nor can they buy at that level for later shipment. Steelmakers fear that delayed delivery of ore will make them more dependent on scrap when operations resume, so they're feeling the brokers out to see what's available. Cast iron grades are fairly active. Foundries realize that they're going to be in a shaky position on pig iron if the strike lasts much longer.

• **Philadelphia** — The market on open hearth scrap continues strong. No. 1 bundles and No. 1 busheling at $41, delivered, and No. 2 bundles at $27-$28 are higher. While No. 1 and No. 2 heavy melting are unchanged at $40 and $35, respectively, no softness is noted. Strength is sustained principally by export demand with at least four cargoes expected to leave here this month.

Domestic buying is featured by purchases of scrap, including No. 2 bundles, by the Conshohocken, Pa., consumer, the first in some months. Following a brief suspension earlier this month of its open hearth and blast furnace operations, that mill obtained an extension of its labor contract and likely will continue to operate indefinitely.

Further purchases of No. 2 bundles have been made by U. S. Steel Corp.'s strikebound Fairless Works, Fairless Hills, Pa., for delivery after resumption of operations.

Short shovel turnings are a shade lower at $24, delivered. All other grades, including cast iron, are unchanged but strong.

• **New York** — Brokers' buying prices on steel scrap remain stable with a continued good movement of material abroad tending to offset the lag in domestic consumption.

Prices of cast grades also are steady despite the fact that little, if any, cast tonnage is moving. It is largely a case of domestic consumption and supply holding in balance.

Stainless steel specialty prices have shown little or no change so far this month. However, there are purchases at existing levels.

• **Chicago**—Demand for steelmaking scrap likely will diminish further since a few scattered mills probably will cease operations as contracts expire and unions decline to grant further extensions. The market is mildly bullish for the long haul.

Under the stalemated conditions, the price structure is untested. All indications are for a long strike and idle mills show no interest in contracting for future supplies.

As vacation closings near an end, foundries are increasing their requirements for melting materials. In some instances, pig iron supplies are cut off by the steel strike, forcing foundries to use more scrap.

• **Youngstown**—Some tonnages of foundry grade scrap are being sold by local scrap dealers to a Cleveland foundry, which is an indication of the eagerness of scrapmen here to obtain some ready cash. Besides the high cost of preparing this material—usually about double that of ordinary No. 2 scrap—they have to pick up a $4.50 a ton freight charge. Most dealers here have virtually suspended buying any peddler scrap, except in a few instances of long time relationships.

• **Buffalo**—The scrap market is surprisingly firm in the face of the steel strike. Instead of backing off, as had been anticipated, prices are showing a strong undertone, although there have been no local sales on which to base higher quotations.

Dealers attribute the firmness to light receipts and the fact that mills in the Youngstown area are offering some atractive prices for Buffalo scrap. Dealers here are able to ship to the Valley, pay the freight, and still show a profit. Dealers are having difficulty buying scrap despite lack of a local mill market.

• **Cincinnati** — Firmness continues in the scrap market here despite the absence of buying. Dealers say the long range outlook is strong, but no sales of steelmaking grades have been made to test this belief. Supply of cast scrap is tight. Flow of material into dealers' yards is slow with that of country scrap off sharply.

• **Detroit**—A softer price tone has

(*Please turn to Page* 157)

Iron and Steel Scrap

Consumer prices per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL, Aug. 12, 1959. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

Aug. 12	$38.33
Aug. 5	38.33
July Avg.	38.45
Aug. 1958	41.58
Aug. 1954	28.80

Based on No. 1 heavy melting grade at Pittsburgh, Chicago, and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	38.00-39.00
No. 2 heavy melting	*34.00-35.00*
No. 1 dealer bundles	39.00-40.00
No. 2 bundles	29.00-30.00
No. 1 busheling	*43.00-44.00*
No. 1 factory bundles	47.00-48.00
Machine shop turnings	20.00-21.00
Mixed borings, turnings	20.00-21.00
Short shovel turnings	24.00-25.00
Cast iron borings	24.00-25.00
Cut structurals:	
2 ft and under	*49.00-50.00*
3 ft and under	*48.00-49.00*
Heavy turnings	34.00-35.00
Punchings & plate scrap	*50.00-51.00*
Electric furnace bundles	47.00-48.00

Cast Iron Grades

No. 1 cupola	45.00-46.00
Stove plate	45.00-46.00
Unstripped motor blocks	*33.00-34.00*
Clean auto cast	46.00-47.00
Drop broken machinery	51.00-52.00

Railroad Scrap

No. 1 R.R. heavy melt.	44.00-45.00
Rails, 2 ft and under	58.00-59.00
Rails, 18 in. and under	59.00-60.00
Random rails	55.00-56.00
Angles, splice bars	52.00-53.00
Railroad specialties	52.00-53.00
Rails, rerolling	61.00-62.00

Stainless Steel Scrap

18-8 bundles & solids	230.00-235.00
18-8 turnings	115.00-120.00
430 bundles & solids	125.00-130.00
430 turnings	55.00-65.00

CHICAGO

No. 1 hvy melt., indus.	37.00-38.00
No. 1 hvy melt., dealer	35.00-36.00
No. 2 hvy melting	33.00-34.00
No. 1 factory bundles	41.00-42.00
No. 1 dealer bundles	*37.00-38.00*
No. 2 bundles	24.00-25.00
No. 1 busheling, indus.	37.00-38.00
No. 1 busheling, dealer	35.00-36.00
Machine shop turnings	17.00-18.00
Mixed borings, turnings	19.00-20.00
Short shovel turnings	19.00-20.00
Cast iron borings	19.00-20.00
Cut structurals, 3 ft	*48.00-49.00*
Punchings & plate scrap	*49.00-50.00*

Cast Iron Grades

No. 1 cupola	*53.00-54.00*
Stove plate	*50.00-51.00*
Unstripped motor blocks	*44.00-45.00*
Clean auto cast	*59.00-60.00*
Drop broken machinery	*59.00-60.00*

Railroad Scrap

No. 1 R.R. heavy melt.	40.00-41.00
R.R. malleable	59.00-60.00
Rails, 2 ft and under	57.00-58.00
Rails, 18 in. and under	58.00-59.00
Angles, splice bars	52.00-53.00
Axles	59.00-60.00
Rails, rerolling	59.00-60.00

Stainless Steel Scrap

18-8 bundles & solids	210.00-215.00
18-8 turnings	110.00-115.00
430 bundles & solids	115.00-120.00
430 turnings	55.00-60.00

YOUNGSTOWN

No. 1 heavy melting	41.00-42.00
No. 2 heavy melting	30.00-31.00
No. 1 busheling	41.00-42.00
No. 1 bundles	42.00-43.00
No. 2 bundles	25.00-26.00
Machine shop turnings	17.00-18.00
Short shovel turnings	22.00-23.00
Cast iron borings	22.00-23.00
Low phos	44.00-45.00
Electric furnace bundles	44.00-45.00

Railroad Scrap

No. 1 R.R. heavy melt.	43.00-44.00

CLEVELAND

No. 1 heavy melting	38.00-39.00
No. 2 heavy melting	27.00-28.00
No. 1 factory bundles	43.00-44.00
No. 1 bundles	38.00-39.00
No. 2 bundles	25.00-26.00
No. 1 busheling	38.00-39.00
Machine shop turnings	14.00-15.00
Short shovel turnings	20.00-21.00
Mixed borings, turnings	20.00-21.00
Cast iron borings	20.00-21.00
Cut foundry steel	40.00-41.00
Cut structurals, plates 2 ft and under	47.00-48.00
Low phos. punchings & plate	39.00-40.00
Alloy free, short shovel turnings	22.00-23.00
Electric furnace bundles	39.00-40.00

Cast Iron Grades

No. 1 cupola	47.00-48.00
Charging box cast	38.00-39.00
Heavy breakable cast	38.00-39.00
Stove plate	44.00-45.00
Unstripped motor blocks	36.00-37.00
Brake shoes	36.00-37.00
Clean auto cast	52.00-53.00
Burnt cast	37.00-38.00
Drop broken machinery	52.00-53.00

Railroad Scrap

R.R. malleable	65.00-66.00
Rails, 2 ft and under	57.00-58.00
Rails, 18 in. and under	58.00-59.00
Rails, random lengths	52.00-53.00
Cast steel	46.00-47.00
Railroad specialties	48.00-49.00
Uncut tires	42.00-43.00
Angles, splice bars	51.00-52.00
Rails, rerolling	58.00-59.00

Stainless Steel

(Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	215.00-220.00
18-8 turnings	110.00-115.00
430 clips, bundles, solids	125.00-130.00
430 turnings	45.00-55.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	33.00
No. 2 heavy melting	31.00
No. 1 bundles	39.00
No. 2 bundles	23.00
No. 1 busheling	37.00
Machine shop turnings	14.00
Short shovel turnings	16.00

Cast Iron Grades

No. 1 cupola	54.00
Charging box cast	45.00
Heavy breakable cast	44.00
Unstripped motor blocks	44.00
Clean auto cast	56.00
Stove plate	46.00

Railroad Scrap

No. 1 R.R. heavy melt.	*41.00*
Rails, 18 in. and under	50.00
Rails, random lengths	45.00
Rails, rerolling	59.00
Angles, splice bars	48.00

BIRMINGHAM

No. 1 heavy melting	35.00-36.00
No. 2 heavy melting	28.00-29.00
No. 1 bundles	38.00-39.00
No. 2 bundles	23.00-24.00
No. 1 busheling	38.00-39.00
Cast iron borings	14.00-15.00
Machine shop turnings	24.00-25.00
Short shovel turnings	27.00-28.00
Bar crops and plates	44.00-45.00
Structurals & plates	43.00-44.00
Electric furnace bundles	38.00-39.00
Electric furnace:	
3 ft and under	37.00-38.00
2 ft and under	36.00-37.00

Cast Iron Grades

No. 1 cupola	55.00-56.00
Stove plate	55.00-56.00
Charging box cast	29.00-30.00
Unstripped motor blocks	42.00-43.00
No. 1 wheels	43.00-44.00

Railroad Scrap

No. 1 R.R. heavy melt.	37.00-38.00
Rails, 18 in. and under	52.00-53.00
Rails, rerolling	57.00-58.00
Rails, random lengths	46.00-47.00
Angles, splice bars	44.00-45.00

PHILADELPHIA

No. 1 heavy melting	40.00
No. 2 heavy melting	35.00
No. 1 bundles	*41.00*
No. 2 bundles	*27.00-28.00*
No. 1 busheling	*41.00*
Electric furnace bundles	42.00
Mixed borings, turnings	20.00†
Short shovel turnings	*24.00*
Machine shop turnings	20.00
Heavy turnings	34.00
Structurals & plate	43.00-45.00
Couplers, springs, wheels	45.00
Rail crops, 2 ft & under	58.00-60.00

Cast Iron Grades

No. 1 cupola	41.00
Heavy breakable cast	45.00
Drop broken machinery	50.00-51.00
Malleable	67.00-68.00

NEW YORK

(Brokers buying prices)

No. 1 heavy melting	30.00-31.00
No. 2 heavy melting	27.00-29.00
No. 1 bundles	30.00-31.00
No. 2 bundles	19.00-20.00
Machine shop turnings	9.00-10.00†
Mixed borings, turnings	12.00-13.00†
Short shovel turnings	13.00-14.00†
Low phos. structurals & plates	36.00-37.00

Cast Iron Grades

No. 1 cupola	36.00-37.00
Unstripped motor blocks	25.00-26.00
Heavy breakable	34.00-35.00

Stainless Steel

18-8 sheets, clips, solids	195.00-200.00
18-8 borings, turnings	85.00-90.00
410 sheets, clips, solids	55.00-60.00
430 sheets, clips, solids	85.00-90.00

BUFFALO

No. 1 heavy melting	33.00-34.00
No. 2 heavy melting	28.00-29.00
No. 1 bundles	33.00-34.00
No. 2 bundles	23.00-24.00
No. 1 busheling	33.00-34.00
Short shovel turnings	21.00-22.00
Machine shop turnings	17.00-18.00
Cast iron borings	19.00-20.00
Low phos structurals and plate, 2 ft and under	43.00-44.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	42.00-43.00
No. 1 machinery	46.00-47.00

Railroad Scrap

Rails, random lengths	45.00-46.00
Rails, 3 ft and under	51.00-52.00
Railroad specialties	43.00-44.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	35.50-36.50
No. 2 heavy melting	30.50-31.50
No. 1 bundles	35.50-36.50
No. 2 bundles	25.00-26.00
No. 1 busheling	35.50-36.50
Machine shop turnings	17.00-18.00
Mixed borings, turnings	17.00-18.00
Short shovel turnings	19.00-20.00
Cast iron borings	18.00-19.00
Low phos., 18 in.	45.00-46.00

Cast Iron Grades

No. 1 cupola	47.00-48.00
Heavy breakable cast	43.00-44.00
Charging box cast	43.00-44.00
Drop broken machinery	53.00-54.00

Railroad Scrap

No. 1 R.R. heavy melt.	40.00-41.00
Rails, 18 in. and under	55.00-56.00
Rails, random lengths	47.00-48.00

HOUSTON

(Brokers' buying prices; f.o.b. cars)

No. 1 heavy melting	37.00-38.00*
No. 2 heavy melting	32.00-33.00*
No. 1 bundles	34.00
No. 2 bundles	24.00-25.00*
Machine shop turnings	17.00
Short shovel turnings	20.00
Low phos. plates & structurals	43.00-44.00

Cast Iron Grades

No. 1 cupola	46.00-47.00
Heavy breakable	33.00
Foundry malleable	42.00-43.00
Unstripped motor blocks	38.50-39.50

Railroad Scrap

No. 1 R.R. heavy melt.	34.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	31.00-32.00
No. 2 heavy melting	25.00-25.50
No. 1 bundles	28.00-29.00
No. 1 busheling	28.00-29.00
Machine shop turnings	8.50-9.00
Short shovel turnings	10.50-11.00
No. 1 cast	36.00-37.00
Mixed cupola cast	36.00-37.00
No. 1 machinery cast	38.00-38.50

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*32.00-33.00*
No. 2 heavy melting	22.00-23.00
No. 1 bundles	*34.00-35.00*
No. 2 bundles	21.00-22.00
No. 1 busheling	*32.00-33.00*
Machine shop turnings	12.00-13.00
Mixed borings, turnings	13.00-14.00
Short shovel turnings	14.00-15.00

Cast Iron Grades

No. 1 cupola	*46.50-47.50*
Stove plate	*38.00-39.00*
Heavy breakable	*39.00-40.00*
Unstripped motor blocks	*28.00-29.00*
Charging box cast	*39.00-40.00*
Clean auto cast	*50.00-51.00*

SEATTLE

No. 1 heavy melting	35.00†
No. 2 heavy melting	33.00†
No. 1 bundles	27.00†
No. 2 bundles	22.00†
Machine shop turnings	17.00†
Mixed borings, turnings	17.00†
Electric furnace No. 1	38.00†

Cast Iron Grades

No. 1 cupola	34.00†
Heavy breakable cast	28.00†
Unstripped motor blocks	26.00†
Stove plate (f.o.b. plant)	21.00†

LOS ANGELES

(Delivered to docks)

No. 1 heavy melting	*39.00*
No. 2 heavy melting	*37.00*
No. 1 bundles	*39.00*
No. 2 bundles	*21.00*
Machine shop turnings	*18.00*
Shovel turnings	*20.00*
Cast iron borings	19.00
Cut structurals and plate 1 ft and under	*49.00*

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	46.50

Railroad Scrap

No. 1 R.R. heavy melt.	39.00

SAN FRANCISCO

No. 1 heavy melting	36.00
No. 2 heavy melting	33.00
No. 1 bundles	33.00
No. 2 bundles	22.00
Machine shop turnings	16.00
Mixed borings, turnings	16.00
Cast iron borings	16.00
Heavy turnings	16.00
Short shovel turnings	16.00
Cut structurals, 3 ft	42.00

Cast Iron Grades

No. 1 cupola	47.00
Charging box cast	34.00
Stove plate	34.00
Heavy breakable cast	28.00
Unstripped motor blocks	31.00
Clean auto cast	40.00
Drop broken machinery	40.00
No. 1 wheels	34.00

HAMILTON, ONT.

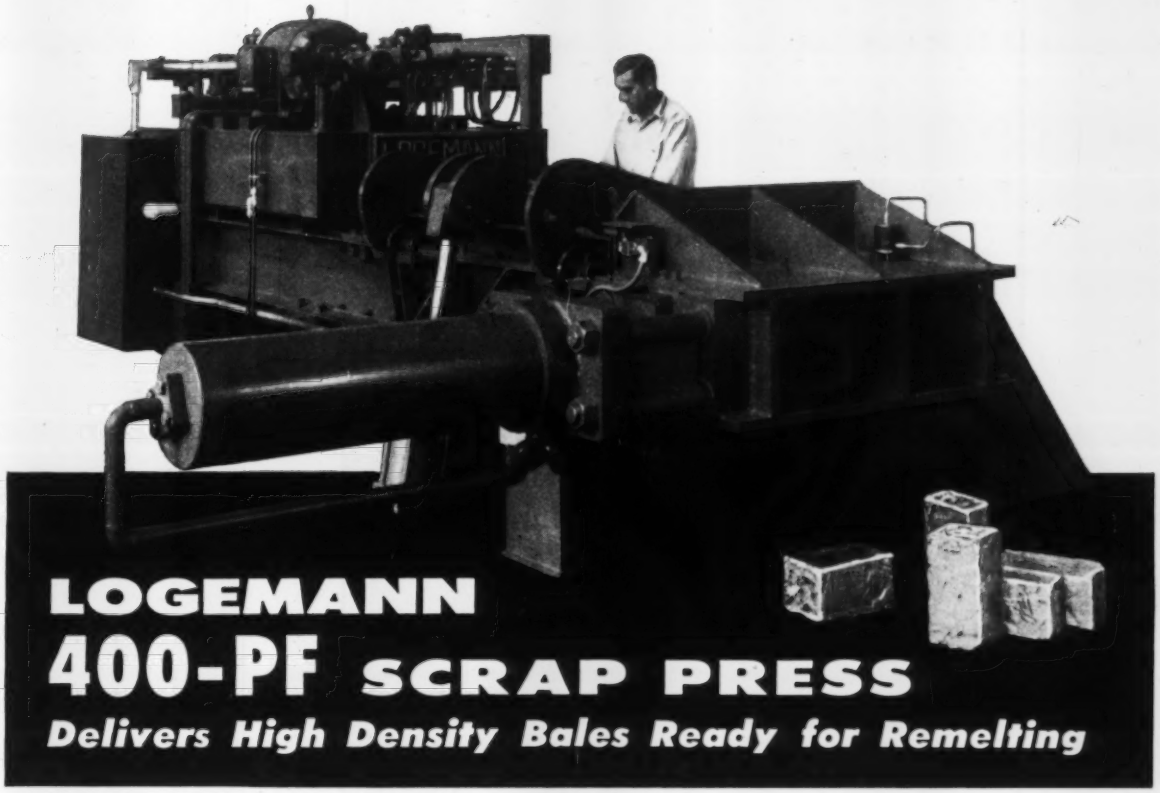
(Brokers' buying prices)

No. 1 heavy melting	32.25
No. 2 heavy melting	28.25
No. 1 bundles	32.25
No. 2 bundles	22.75
Mixed steel scrap	24.25
Mixed borings, turnings	13.00
Busheling, new factory: Prepared	32.25
Unprepared	26.25
Short steel turnings	17.00

Cast Iron Grades‡

No. 1 machinery cast	46.50-48.00

*Prices to shippers, f.a.s.
†Nominal.
‡F.o.b. Hamilton, Ont.



LOGEMANN 400-PF SCRAP PRESS

Delivers High Density Bales Ready for Remelting

▶ Designed Specifically for Pressing:

☆ COPPER ☆ BRASS ☆ ALUMINUM

☆ STAINLESS STEEL AND BLACK STEEL SCRAP

☆ WIRE ☆ COILS ☆ SKELETONS

☆ CONTAINERS ☆ UTENSILS

HERE ARE THE FEATURES YOU WANT

Top-loading by means of a filling-hopper which can be charged at floor level; a tamper-cover to crush down bulky scrap into the press-box; a charging plate arrangement that permits the hopper to dump a load of scrap into the press while a bale is being made, thus speeding up the production; and the positive discharge of the bale from the bottom. Bottom discharge insures cleaning of the box with each bale, avoiding contamination of bales by foreign matter that might otherwise remain in the press-box.

OPERATION IS ENTIRELY HYDRAULIC

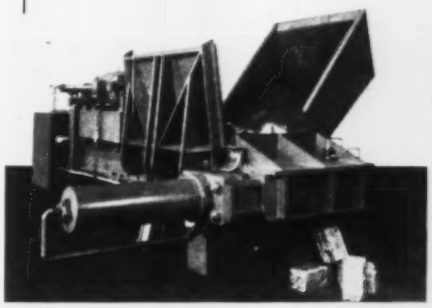
Special valves are controlled by electric switches and relays. To retain flexibility, the hopper and tamper-cover are independently controlled; pressing and bale discharge are automatic, though manual control is also available, when desired.

SPECIFICATIONS

Press-box is 72 inches long, 36 inches wide and 12 inches deep, and the loading area is 60 inches by 36 inches. Bales are 12 inches high, width can be optionally 7, 6, 5 or 4 inches, length varies depending on the character and quantity of scrap charged, which also determines the bale weights. High density is attained through use of powerful hydraulic rams.

OUTPUT

Hourly output is determined by speed of loading. Press operates at high speed; three charges can be in process simultaneously — one in the filling hopper, another on the charging plate, a third under compression.



When writing for complete details, please state the quantity and character of scrap to be baled.

LOGEMANN BROTHERS CO.

3126 W. BURLEIGH STREET • MILWAUKEE 10, WISCONSIN

Action Stirred Up in Capital

That's what backers of lead-zinc legislation say as they predict election year "thaw" will bring more support from Congress, administration. Tariff study underway

Nonferrous Metal Prices, Pages 156 & 157

LOOK FOR a resurgence of Washington-oriented activity aimed at aiding the domestic lead and zinc industries.

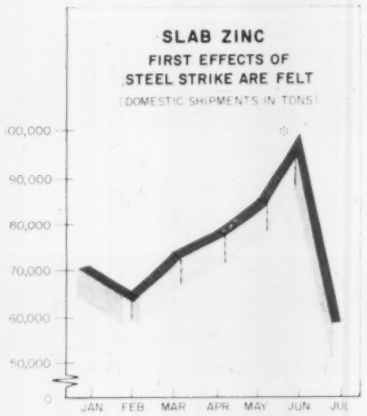
• **First Salvo**—The Tariff Commission has started an investigation to determine if imports of lead and zinc fabricated products constitute a threat to U. S. miners, processors, and manufacturers. Officially, you'll hear the study was undertaken at the request of a bloc of 14 U. S. senators and a number metalworking executives who had written letters of complaint to the commission. Actually, action was sparked by a secret order from the White House.

• **What's Worrying Producers**—The lead and zinc industry never has waxed enthusiastic about quotas. Most domestic producers favor tariffs. They feel quotas allow too much ore and metal to enter the country. U. S. companies with sizable operations outside the country, on the other hand, have favored no government intervention.

The crux of the current situation is that quotas don't exert any control over lead and zinc imported into the U. S. in the form of manufactured items. Producers say that since the first of the year there's been a sharp stepup in the tonnage of zinc oxide entering the U. S. (mainly at Boston and Los Angeles) from England, Holland, France, and Canada. More rolled zinc products are coming in from West Germany and other European nations.

Lead people say increased litharge (lead oxide) shipments from Mexico are reported entering southern and eastern seaboard distribution centers. More pipe and sheets are filtering into the East Coast and Great Lakes regions from England, Holland, Belgium, West Germany, and Spain.

Domestic companies say it's not the present tonnage of imported fabricated goods (about 1500 tons monthly for lead, a little more for zinc) that worries them primarily. Rather it's that the lower priced foreign goods weaken the entire domestic price structure; the threat is that the material dribbling in now may forebode a flood. Other metalmen believe the menace is greatly exaggerated.



Inflated by abnormal shipments on consignments of approximately 9,000 tons.
Source: American Zinc Institute Inc.

• **Now What?**—The Tariff Commission study will probably be completed sometime before the first of the year, although there's no statutory deadline. Unlike the escape clause investigation which led to quotas, however, no hearings will be held, no recommendations of interpretations made. The reason is that this is a different type of investigation—technically, it's authorized by Section 332 of the Tariff Act. The report will simply list the commission's findings.

• **More Activity**—Proponents of the legislation in industry and Congress that would give early aid to lead and zinc aren't going to wait around a possible 18 months for additional help. Last week, 16 senators sent a letter to President Eisenhower asking that he take "positive action to help the depressed lead and zinc mining industry." As STEEL went to press, Washington sources were hinting that Senate policy makers are mapping a resolution that would direct the Tariff Commission to make a complete study of the two metals and to report back to Congress not later than next Mar. 31. Besides setting forth the facts, the report would state what is necessary to place the domestic lead and zinc industry on a sound basis.

• **Better Chance**—Observers say odds for Congressional and administration approval of lead-zinc legislation has improved. At least some congressmen feel "maybe we were led down the garden path in reciprocal trade agreements." Another Washington source makes this comment: "Don't forget 1960 is an election year. Although liberal reciprocal trade agreements might sound good in international relations, they don't necessarily win friends at home."

NONFERROUS PRICE RECORD

	Aug. 12 Price	Last Change	Previous Price	July Avg	June Avg	Aug., 1958 Avg
Aluminum	24.70	Aug. 1, 1958	24.00	24.700	24.700	24.700
Copper	30.00	Aug. 7, 1959	29.50-30.00	30.048	31.490	26.510
Lead	11.80	May 7, 1959	11.30	11.800	11.800	10.646
Magnesium	35.25	Aug. 13, 1956	33.75	35.250	35.250	35.250
Nickel	74.00	Dec. 6, 1956	64.50	74.000	74.000	74.000
Tin	101.75	Aug. 12, 1959	101.50	102.298	104.284	94.995
Zinc	11.00	Feb. 25, 1959	11.50	11.000	11.000	10.000

Quotations in cents per pound based on: COPPER, mean of primary and secondary, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, E. St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary pig, 99.5+%, f.o.b. customer custody; MAGNESIUM, pig 99.8%, Velasco, Tex.

daddy's home!

After the hard work, the petty irritations, this is the moment that gives the day its meaning. This is the distillation of all that you are striving to preserve.

But in the routine of making a home and earning a living, there's one essential that it's too easy to overlook: your health...the health of your family.

Have you done all you can to protect yourself against cancer? *A health checkup every year is "living insurance."*

Have you done your share to protect your children? *Today's research will mean better methods of treatment, possibly prevention, tomorrow.*

Let the glow of your next homecoming be your reminder: *Guard Your Family—Fight Cancer with a Checkup and a Check.*

Send your check to "Cancer," *c/o your local post office.*

American Cancer Society

Nonferrous Metals

Cents per pound, carlots except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99.5%, pigs, 24.70; ingots, 26.80, 30,000 lb or more, f.o.b. customer custody.

Aluminum Alloy: No. 13, 28.60; No. 43, 28.40; No. 195, 29.40; No. 214, 30.20; No. 356, 28.60; 30 or 40 lb ingots.

Antimony: R.M.M. brand, 99.5%, 29.00; Lone Star brand, 29.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 24.50-25.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97% lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $74.75 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 3.75-4.75% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. shipping point.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.30 per lb deld.

Cobalt: 97.99%, $1.75 per lb for 500-lb keg, $1.77 per lb for 100 lb case; $1.82 per lb under 100 lb.

Columbium: Powder, $55-85 per lb, nom.

Copper: Electrolytic, 30.00 deld.; custom smelters, 30.00; lake, 30.00 deld.; fire refined, 29.75 deld.

Germanium: First reduction, less than 1 kg, 38.30 per gram; 1-10 kg, 33.30 per gram; 10 kg or more, 31.30 per gram; intrinsic grade, 33.30-35.30 per gram.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $75-80 per troy oz nom.

Lead: Common, 11.80; chemical, 11.90; corroding, 11.90, St. Louis. New York basis, add 0.20.

Lithium: 1 lb or 2 lb ingots, less than 50 lb, $11 per lb, f.o.b. Minneapolis; 50-99 lb, $10; 100-499 lb, $9.50; 500 lb or more, $9 per lb, delivered.

Magnesium: Pig, 35.25; ingot, 36.00 f.o.b. Velasco, Tex.; 12 in. sticks, 59.00 f.o.b. Madison, Ill.

Magnesium Alloys: AZ91A (diecasting), 40.75 deld.; AZ63A, AZ92A, AZ91C (sand casting), 40.75, f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $234-236 per 75 lb flask.

Molybdenum: Unalloyed forging billets, 4.125-7.0 in. diam., 50-4999 lb, $8.15-11.50 per lb, depending on quantity; 5000 lb or more, $8 per lb, f.o.b. Coldwater, Mich.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 74.00; 10-lb pigs, unpacked, 78.25; "XX" nickel shot, 79.50; "F" nickel shot for addition to cast iron, 74.50; "F" nickel, 5 lb ingots in kegs for addition to cast iron, 75.50. Prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 1.01. Nickel oxide sinter at Buffalo, New York, or other established U. S. ports of entry, contained nickel, 69.60.

Osmium: $70-100 per troy oz nom.

Palladium: $18-20 per troy oz.

Platinum: $77-80 per troy oz from refineries.

Radium: $16-21.50 per mg radium content, depending on quantity.

Rhodium: $122-125 per troy oz.

Ruthenium: $55-60 per troy oz.

Selenium: $7.00 per lb, commercial grade.

Silver: Open market, 91.375 per troy oz.

Sodium: Solid pack, c.l., 19.50; l.c.l., 20.00; brick, c.l., 21.00; l.c.l., 21.50; tank car, 17.00.

Tantalum: Melting stock, $35 per lb; rod, $60 per lb nom.; sheet, $55 per lb nom.

Tellurium: $2.50 per lb.

Thallium: $7.50 per lb.

Tin: Straits, N. Y., spot and prompt, 101.75.

Titanium: Sponge, 99.3 + % grade A-1, ductile (0.3% Fe max.), $1.60; grade A-2 (0.5% Fe max.), $1.50 per lb.

Tungsten: Powder, 98.8%, carbon reduced, 1000-lb lots, $2.75-2.90 per lb nom., f.o.b. shipping point; less than 1000 lb, add 15.00; 99 + % hydrogen reduced, $3.30-3.80.

Zinc: Prime western, 11.00; brass special, 11.25; intermediate, 11.50, East St. Louis, freight allowed over 0.50 per lb. New York basis, add 0.50. High grade, 12.00; special high grade, 12.25 deld. Diecasting alloy ingot No. 3, 14.00; No. 2, 14.50; No. 5, 14.25 deld.

Zirconium: Reactor grade sponge, 100 lb or less, $7 per lb; 100-500 lb, $6.50 per lb; over 500 lb, $6 per lb.

(Note: Chromium, manganese, and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 26.00-27.75; No. 12 foundry alloy (No. 2 grade), 23.75-24.00; 5% silicon alloy, 0.60 Cu max., 25.00; 13 alloy, 0.60 Cu max., 25.00; 195 alloy, 26.75-27.00; 108 alloy, 24.25-24.50. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 24.50; grade 2, 23.25; grade 3, 22.25; grade 4, 21.50.

Brass Ingot: Red brass No. 115, 29.25; tin bronze, No. 225, 39.75; No. 245, 33.50; high-leaded tin bronze, No. 305, 33.50; No. 1 yellow, No. 405, 23.75; manganese bronze, No. 421, 26.75.

Magnesium Alloy Ingot: AZ63A, 37.50; AZ91B, 37.50; AZ91C, 41.25; AZ92A, 37.50.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nom. 1.9% Be alloy.) Strip, $1.895, f.o.b. Temple, Pa., or Reading, Pa.; rod, bar, wire, $1.875, f.o.b. Temple, Pa.

COPPER WIRE

Bars, soft, f.o.b. eastern mills, 20,000-lb lots, 35.355; l.c.l, 35.98. Weatherproof, 20,000-lb lots, 36.29; l.c.l., 37.04.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more, $17.50 per cwt; pipe, full coils, $17.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill.) Sheet and strip, $7.25-17.00; sheared mill plate, $5.25-10.00; wire, $5.75-10.00; forging billets, $3.55-5.75; hot-rolled and forged bars, $4.25-7.50.

ZINC

(Prices per lb, c.l., f.o.b. mill) Sheets, 26.00; ribbon zinc in coils, 21.50; plates, 20.00.

ZIRCONIUM

Plate, $12.50-19.20; H.R. strip, $12.50-22.90; C.R. strip, $15.90-31.25; forged or H.R. bars, $11.00-17.40.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	138	120	138
Strip, C.R.	124	108	138
Plate, H.R.	130	110	126
Rod, Shapes, H.R.	107	89	109
Seamless Tubes	157	129	200

ALUMINUM

Sheets: 1100, 3003 and 5005 mill finish (30,000 lb base; freight allowed).

Thickness Range Inches	Flat Sheet	Coiled Sheet
0.250-0.136	42.80-47.30	.....
0.136-0.096	43.20-48.30	.....
0.126-0.103	.....	39.20-39.80
0.096-0.077	43.80-50.00	39.30-40.00
0.077-0.068	44.30-52.20	.....
0.077-0.061	.....	39.50-40.70
0.068-0.061	44.30-52.20	.....
0.061-0.048	44.90-54.40	40.10-41.80
0.048-0.038	45.40-57.10	40.60-43.20
0.038-0.030	45.70-62.00	41.00-45.70
0.030-0.024	46.20-53.70	41.30-45.70
0.024-0.019	46.90-56.80	42.40-44.10
0.019-0.017	47.70-54.10	43.00-44.70
0.017-0.015	48.60-55.00	43.80-45.50
0.015-0.014	46.60	44.80-46.50
0.014-0.012	50.80	45.50
0.012-0.011	51.00	46.70
0.011-0.0095	53.50	48.10
0.0095-0.0085	54.60	49.60
0.0085-0.0075	56.20	50.80
0.0075-0.007	57.70	52.30
0.007-0.006	59.30	53.70

ALUMINUM (continued)

Plates and Circles: Thickness 0.250-3 in. 24-60 in. width or diam., 72-240 in. lengths.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	42.40	47.20
5050-F	43.50	48.30
3004-F	44.50	50.20
5052-F	45.10	50.90
6061-T6	45.60	51.70
2024-T4	49.30	56.10
7075-T6*	57.60	64.70

*24-48 in. width or diam., 72-180 in. lengths.

Screw Machine Stock: 30,000 lb base.

Diam.(in.)or across flats*	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
0.125	76.90	73.90	....	....
0.250	62.00	60.20	89.10	76.60
0.375	61.20	60.00	73.50	68.50
0.500	61.20	60.00	73.50	68.50
0.625	61.20	60.00	69.80	64.20
0.750	59.70	58.40	63.60	60.40
0.875	59.70	58.40	63.60	60.40
1.000	59.70	58.40	63.60	60.40
1.125	57.30	56.10	61.50	58.30
1.250	57.30	56.10	61.50	58.30
1.350	57.30	56.10	61.50	58.30
1.500	57.30	56.10	61.50	58.30
1.625	55.00	53.60	....	56.20
1.750	55.00	53.60	60.30	56.20
1.875	55.00	53.60	....	56.20
2.000	55.00	53.60	60.30	56.20
2.125	53.50	52.10	....	....
2.250	53.50	52.10	....	56.20
2.375	53.50	52.10	....	....
2.500	53.50	52.10	....	56.20
2.625	....	50.40	....	....
2.750	51.90	50.40	....	56.20
2.875	....	50.40	....	....
3.000	51.90	50.40	....	56.20
3.125	....	50.40	....	....
3.250	....	50.40	....	....
3.375	....	50.40	....	....

*Selected sizes.

Forging Stock: Round, Class 1, random lengths, diam., 0.375-8 in., "F" temper; 2014, 42.20-55.00; 6061, 41.60-55.00; 7075, 61.60-75.00; 7070, 66.60-80.00.

Pipe: ASA schedule 40, alloy 6063-T6 standard length, plain ends, 90,000 lb base, dollars per 100 ft. Nominal pipe sizes: ⅜ in., 18.85; 1 in., 29.75; 1¼ in., 40.30; 1½ in., 48.15; 2 in., 58.30; 4 in., 160.20; 6 in., 287.55; 8 in., 432.70.

Extruded Solid Shapes:

Factor	Alloy 6063-T5	Alloy 6062-T6
9-11	42.70-44.20	51.30-55.50
12-14	42.70-44.20	52.00-56.50
15-17	42.70-44.20	53.20-58.20
18-20	43.20-44.70	55.20-60.80

MAGNESIUM

Sheet and Plate: AZ31B standard grade, 0.32 in., 103.10; .081 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.0 in., 67.90. AZ31B spec. grades, .032 in., 171.30; .081 in., 108.80; .125 in., 98.10; .188 in., 95.70; .250-2.00 in., 93.30. Tread plate, 60-192 in. lengths, 24-72 in. widths; .125 in., 74.90; .188 in., 71.70-72.10; .25-.75 in., 70.60-71.60. Tooling plate, 0.25-3.0 in., 73.00.

Extruded Solid Shapes:

Factor	Com. Grade (AZ31C)	Spec. Grade (AZ31B)
6-8	65.30-67.60	84.60-87.40
12-14	65.30-67.60	85.70-88.00
24-26	66.10-75.30	90.60-91.30
36-38	66.10-75.30	104.20-105.30

NONFERROUS SCRAP

DEALERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 23.00-23.50; No. 2 heavy copper and wire, 21.00-21.50; light copper, 19.00-19.50; No. 1 composition red brass, 17.75-18.25; No. 1 com-

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES e (Based on copper at 30.00c)		
	Sheets, Strip, Plate	Rod	Wire	Seamless Tubes	Clean Heavy	Rod Ends	Clean Turnings
Copper	54.13b	51.36c	....	54.32	26.000	26.000	25.250
Yellow Brass	47.24	31.81d	47.78	50.65	19.625	18.750	17.750
Low Brass, 80%	50.03	47.97	50.57	53.34	22.000	21.750	21.250
Red Brass, 85%	51.02	50.96	51.56	54.33	22.875	22.625	22.125
Com. Bronze, 90%	52.55	52.49	53.09	55.61	23.875	23.625	23.125
Manganese Bronze	55.61	49.30	59.74	....	18.375	18.125	17.500
Muntz Metal	49.95	45.26	....	....	18.375	18.125	17.625
Naval Brass	51.90	45.71	58.46	55.31	18.250	18.000	17.500
Silicon Bronze	59.23	58.42	58.77	76.91	25.500	25.250	24.500
Nickel Silver, 10%	62.85	65.18	65.18	....	24.500	24.250	12.250
Phos. Bronze	73.92	74.42	74.42	75.60	27.125	26.875	25.875

a, Cents per lb, f.o.b. mill; freight allowed on 500 lb or more. b, Hot-rolled. c, Cold-drawn. d, Free cutting. e, Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb.

position turnings, 16.25-16.75; new brass clippings, 14.50-15.00; light brass, 11.25-11.75; heavy yellow brass, 12.25-12.75; new brass rod ends, 12.50-13.00; auto radiators, unsweated, 13.50-14.00; cocks and faucets, 14.00-14.50; brass pipe, 14.00-14.50.

Lead: Soft scrap lead, 7.75-8.25; battery plates, 2.50-3.00; linotype and stereotype, 9.25-9.75; electrotype, 7.75-8.25; mixed babbitt, 9.75-10.25.

Monel: Clippings, 30.00-32.00; old sheets, 26.00-28.00; turnings, 20.00-22.00; rods, 30.00-32.00.

Nickel: Sheets and clips, 52.00-54.00; rolled anodes, 52.00-54.00; turnings, 39.00-40.00; rod ends, 52.00-54.00.

Zinc: Old zinc, 3.25-3.50; new diecast scrap, 3.00-3.25; old diecast scrap, 1.75-2.00.

Aluminum: Old castings and sheets, 11.50-12.00; clean borings and turnings, 7.25-7.75; segregated low copper clips, 14.75-15.25; segregated high copper clips, 14.25-14.75; mixed low copper clips, 15.00-15.50; mixed high copper clips, 12.25-12.75.

(Cents per pound, Chicago)

Aluminum: Old castings and sheets, 12.75-13.25; clean borings and turnings, 10.00-10.50; segregated low copper clips, 17.25-17.75; segregated high copper clips, 16.25-16.75; mixed low copper clips, 16.50-17.00; mixed high copper clips, 15.75-16.25.

(Cents per pound, Cleveland)

Aluminum: Old castings and sheets, 11.50-11.75; clean borings and turnings, 10.50-11.00; segregated low copper clips, 15.75-16.25; segregated high copper clips, 14.75-15.25; mixed low copper clips, 15.25-15.75; mixed high copper clips, 14.25-14.75.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)
Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 56.00; light scrap, 51.00; turnings and borings, 36.00.

Copper and Brass: No. 1 heavy copper and wire, 26.50; No. 2 heavy copper and wire, 24.50; light copper, 22.25; refinery brass (60% copper) dry copper content, 24.00.

INGOTMAKERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 26.50; No. 2 heavy copper and wire, 24.50; light copper, 22.25; No. 1 composition borings, 21.00; No. 1 composition solids, 21.50; heavy yellow brass solids, 15.50; yellow brass turnings, 14.50; radiators, 17.25.

PLATING MATERIAL

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.30.

Copper: Flat-rolled, 46.29; oval, 44.50, 5000-10,000 lb; electrodeposited, 36.00, 2000-5000 lb lots; cast, 41.00, 5000-10,000 lb quantities.

Nickel: Depolarized, less than 100 lb, 114.25; 100-499 lb, 112.00; 500-4999 lb, 107.50; 5000-29,999 lb, 105.25; 30,000 lb, 103.00. Carbonized, deduct 3 cents a lb.

Tin: Bar or slab, less than 200 lb, 120.50; 200-499 lb, 119.00; 500-999 lb, 118.50; 1000 lb or more, 118.00.

Zinc: Balls, 18.00; flat tops, 18.00; flats, 20.75; ovals, 20.00, ton lots.

CHEMICALS

Cadmium Oxide: $1.30 per lb in 100-lb drums.
Chromic Acid (flake): 100-2000 lb, 31.00; 2000-10,000 lb, 30.50; 10,000-20,000 lb, 30.00; 20,000 lb or more, 29.50.

Copper Cyanide: 100-200 lb, 65.90; 300-900 lb, 63.00; 1000-19,900 lb, 61.90.

Copper Sulphate: 100-1900 lb, 14.95; 2000-5900 lb, 12.95; 6000-11,900 lb, 12.70; 12,000-22,900 lb, 12.45; 23,000 lb or more, 11.95.

Nickel Chloride: 100 lb, 45.00; 200 lb, 43.00; 300 lb, 42.00; 400-4900 lb, 40.00; 5000-9900 lb, 38.00; 10,000 lb or more, 37.00.

Nickel Sulphate: 5000-22,999 lb, 29.00; 23,000-39,990 lb, 28.50; 40,000 lb or more, 28.00.

Sodium Cyanide (Cyanobrik): 200 lb, 23.80; 400-800 lb, 20.80; 1000-4900 lb, 19.80; 5000-19,900 lb, 18.80; 20,000 lb or more, 17.60.

Sodium Stannate: Less than 100 lb, 79.50; 100-600 lb, 70.20; 700-1900 lb, 67.40; 2000-9900 lb, 65.60; 10,000 lb or more, 64.20.

Stannous Chloride (Anhydrous): 25 lb, 155.00; 100 lb, 150.10; 400 lb, 147.70; 800-19,900 lb, 106.80; 20,000 lb or more, 100.70.

Stannous Sulphate: Less than 50 lb, 140.20; 50 lb, 110.20; 100-1900 lb, 108.20; 2000 lb or more, 106.20.

Zinc Cyanide: 100-200 lb, 59.00; 300-900 lb, 57.00.

(Concluded from Page 151)

developed in the scrap market. Yards are beginning to fill close to capacity as generation of scrap exceeds shipments to users by a wide margin. A local consumer purchased a tonnage of foundry scrap at a price $2 under that paid last month. That is equivalent to a drop of about $1 on steelmaking grades. Even dealer-to-dealer trading is quiet.

• **Birmingham**—With four producers of electric furnace steel still operating here, the lack of a market for open hearth grades of scrap is having little over-all effect on total sales. Foundries are also buying actively and prices are firm.

The export market also is stronger, with No. 1 heavy melting quoted at most ports at $39 and No. 2 at $36, exclusive of bundles.

• **St. Louis**—The scrap market is quiet, with little trading. The strike still has buyers and sellers guessing. Material is scarce, and mills aren't purchasing aggressively, ap-

METAL STAMPING ENGINEER

PLANT MAKING STAMPING AND ASSEMBLIES TO CUSTOMERS PRINTS. MUST ESTIMATE PRICES ON DIES AND PARTS. EXPERIENCE WITH PROGRESSIVE HIGH PRODUCTION TOOLING AS WELL AS CONVENTIONAL METHODS. ESSENTIAL. MUST BE FULLY QUALIFIED. GOOD SALARY PLUS OTHER BENEFITS.

THE CUYAHOGA STAMPING CO.
10201 Harvard Ave., Cleveland 5, Ohio
DIamond 1-8100

WANTED

Experienced Man To Head Our Aluminum Sales Division

D. M. Stembel
LOCKHART IRON AND STEEL CO.
McKees Rocks, Pa.

CLASSIFIED

Help Wanted

METALLURGICAL ENGINEER for high carbon wire mill. Minimum three years' experience. Work involves manufacturing processes, problems and product responsibility. Will be in direct charge of junior engineer. Address J. A. Turner, John A. Roebling's Sons Division, The Colorado Fuel and Iron Corporation, 640 So. Broad St., Trenton 2, N. J., giving age, experience, education and salary requirements.

Positions Wanted

SALES MANAGER, 34, college degree, 8 years experience in steel. Interested in future. Call Norfolk, Va., UL 5-1790, or write Box 784, STEEL, Penton Bldg., Cleveland 13, Ohio.

CHIEF ESTIMATOR—Sixteen years experience steel plate, pressure vessel and machinery fabrication. Write Box 776, STEEL, Penton Bldg., Cleveland 13, Ohio.

Modern Metalworking Plant Available

ONE STORY

125,000 sq. ft.

in Philadelphia's finest Industrial Neighborhood

★ Main Line Penna. R.R. siding
★ Drive-in truck loading
★ Unlimited floorloads
★ High ceilings
★ Extra-heavy power and transformer facilities
★ Bridge type cranes

Write for illustrated brochure

BINSWANGER

Leading the Nation in Industrial Real Estate
1420 WALNUT ST., PHILA. 2 • PE 5-0202

IF YOU OPERATE A FURNACE . . . . .

We will purchase your scrap linings, retorts, conveyors, muffles, racks, etc. Any item made of Nickel alloy.

Write, Wire or Call
Weinstein Co.,
610 W. 8th St.
Jamestown, N. Y.
Phone 61-154

FOR SALE LESS THAN MILL PRICE
NEW PLATE

90 tons 5/16 x 18 x 72 nickel chrome moly SAE 8630 annealed, P. & O. on skids.

BARKSDALE MFG. CO.
Blytheville, Ark.

FOR SALE

Three used automatic conductor pipe machines in good condition for 3" and 4" plain round and corrugated pipe and 3" square pipe—priced right.

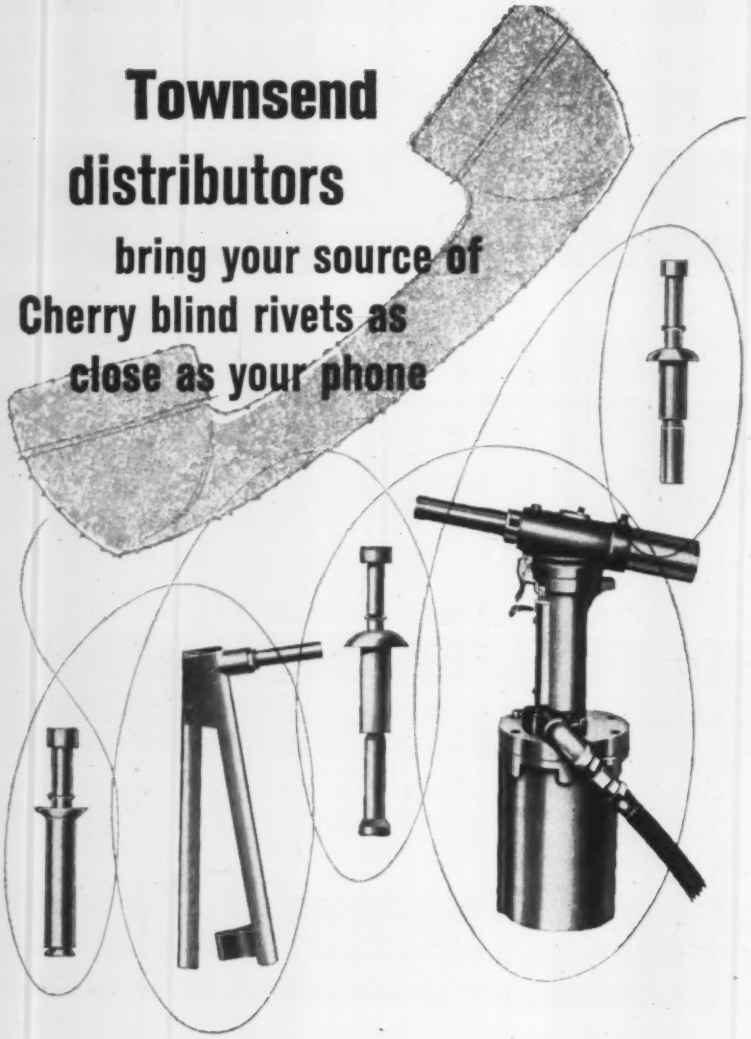
Write Box 785, STEEL
Penton Bldg. Cleveland 13, Ohio

BERRY BEARING COMPANY
Bearing Headquarters Since 1920
Phone: DAnube 6-6800
2633 S. Michigan Ave. • Chicago 16, Ill.

Belgian steel and cement exporter touring United States of America with steel mill executive early September wishes to act as purchasing agent on a commission basis for American steel warehouses and/or importers. For details address Box No. 781, STEEL, Penton Bldg., Cleveland 13, Ohio.

Townsend distributors

bring your source of Cherry blind rivets as close as your phone



A reliable source of Cherry blind rivets and tools is waiting to serve you at the other end of your telephone line in more than 75 cities throughout the United States and Canada.

This network of Townsend jobber-distributors provides you with a ready inventory of self-plugging and pull-thru rivets together with a full range of hand and power-actuated setting guns and other installation tools.

In addition, the jobber-distributor in your area is qualified to give you expert assistance in selecting the proper size and style of rivet for your particular application.

Your jobber-distributor now stocks Townsend Cherry blind rivets in steel, aluminum alloy, Monel and copper—in 3/32", 1/8", 3/16", 1/4" and 9/32" diameters—in a wide range of grip lengths and a variety of head styles. For the name of the jobber-distributor nearest you, write to Engineered Fasteners Division, P.O. Box 71-C, Ellwood City, Pa.

Townsend Company

ESTABLISHED 1816

Engineered Fasteners Division

ELLWOOD CITY · PENNSYLVANIA

Cherry Rivet Division · Santa Ana, California

In Canada: Parmenter & Bulloch Manufacturing Company, Limited, Gananoque, Ontario

parently still having satisfactory inventories. Prices are firm with a rising tendency. The only movement pricewise last week was a $1 advance in No. 1 heavy melting railroad scrap.

• **Houston**—Scrap prices are unchanged here as exporters continue to control the market. Inland Texas shippers are working on old Mexican orders and on commitments to the Lone Star mill. Over-the-scale intake is still generally poor and, because of the export activity, there has been no backing up of scrap.

Export prices to shippers for scrap delivered shipside at Houston have leveled off at $37-$38 for No. 1 heavy melting, $32-$33 for No. 2 grade and $24-$25 for No. 2 bundles. In other Gulf ports, including Beaumont, Baton Rouge, and New Orleans, prices range from $1 to $2 higher.

• **San Francisco**—Despite reports of price cutting on what little steel scrap is moving, posted quotations are unchanged. Big consumers are not buying.

• **Los Angeles**—A large tonnage is moving to the docks for export, but not much is going to domestic mills. Scrap prices are now being quoted "delivered to docks."

Metallurgical Coke . . .

Metallurgical Coke Prices, Page 147

The price of metallurgical coke delivered to Chicago from St. Paul ovens has been lowered to $34.68 a ton. Effective Aug. 11, the freight rate from St. Paul to Chicago was reduced 5 cents a ton to $3.43. The price of coke at Koppers Co. Inc.'s ovens at St. Paul is $31.25 a ton, f.o.b. cars.

Distributors . . .

Prices, Page 146

Steel service centers are receiving larger inquiries from consumers who are beginning to show more concern over supply. Some attempts at "raiding" have been noted in certain lines, notably sheets, hot rolled bars, and plates. Distributors are resisting those attempts to place excessively large orders so as to maintain reasonable inventories for covering their regular customers' needs.

Advertising Index

Acme-Newport Steel Co. 128
Acme Steel Co., Acme Steel Products Division 25
Aetna-Standard Division, Blaw-Knox Co. 33
Alan Wood Steel Co. 121
Allegheny Ludlum Steel Corporation 32
Allen Manufacturing Co. 118
Aluminium Limited Sales, Inc. 9
American Steel Warehouse Association, Inc. 14
Armco Steel Corporation 40

Babcock & Wilcox Co., The, Tubular Products Division ..... Inside Front Cover
Barksdale Manufacturing Co. 157
Berry Bearing Co. 157
Bethlehem Steel Co. 1
Blaw-Knox Co., Aetna-Standard Division 33
Blaw-Knox Co., Blaw-Knox Equipment Division 149
Brown-Lipe-Chapin Division of General Motors Corporation 2
Bullard Co., The 85

Carpenter Steel Co., The 31
Chemical Corporation, The 67
Chicago Rawhide Manufacturing Co. 53
Cincinnati Milling Machine Co., The, Cincinnati Milling Products Division 29
Clad-Rex Division of Simoniz Co. 160
Cleveland Crane & Engineering Co., The 136
Colorado Fuel & Iron Corporation, The 23, 108, 109, 157
Commercial Shearing & Stamping Co. 3
Continental-Diamond Fibre 105
Continental Screw Co. 8
Continental Steel Corporation 133
Copperweld Steel Co., Ohio Seamless Tube Division 79
Crucible Steel Company of America 76, 77

De Laval Steam Turbine Co. 82, 83
Diamond Manufacturing Co. 126
Dreis & Krump Manufacturing Co. 10
Dykem Co., The 149

Eastern Stainless Steel 54
Elwell-Parker Electric Co., The 7
Eureka Fire Brick Works 66

Fischer Special Mfg. Co. 132
Foote Bros. Gear & Machine Corporation 22
Fuller Co. 24

General Motors Corporation, Brown-Lipe-Chapin Division 2
General Motors Corporation, Hyatt Bearings Division 60
General Motors, New Departure Division ... 63
General Motors Corporation, Saginaw Steering Gear Division 127
Goodyear Tire & Rubber Co., Inc., The, Industrial Products Division 4

Harco Corporation, The 150
Harnischfeger Corporation 17, 18
Hyatt Bearings Division, General Motors Corporation 60

Industrial Metal Protectives 84
Inland Steel Co. 123
International Nickel Co., Inc., The 34

Jones & Lamson Machine Co. 112

Kaiser Engineers Division of Henry J. Kaiser Co. 19
Keystone Steel & Wire Co. 111

Leeds & Northrup Co. 130
Linde Co., Division of Union Carbide Corporation 28
Lockhart Iron and Steel Co. 157
Logemann Brothers Co. 153
Lord Baltimore Hotel, The 66

McLouth Steel Corporation 140

Micromatic Hone Corporation 80, 81
Mobil Oil, Inc. 20, 21
Mundt, Charles, & Sons 16

National Acme Co., The 56, 57
National Steel Corporation 11
New Departure Division of General Motors .. 63
Niagara Machine & Tool Works 107
Nilson, A. H., Machine Co., The 86

Ohio Seamless Tube Division of Copperweld Steel Co. 79
Ohio Steel Foundry Co., The 68
Owen Bucket Co., The 150

Philadelphia Gear Corporation 96
Pines Engineering Co., Inc. 26

Republic Steel Corporation 12, 13
Roebling's, John A., Sons Corporation, A Subsidiary of The Colorado Fuel & Iron Corporation 23, 157
Rogers Brothers Corporation 149
Royal McBee Corporation, Data Processing Division 95

Saginaw Steering Gear Division of General Motors Corporation 127
Simoniz Co., Clad-Rex Division 160
Square D Co. 74
Stamco, Inc. 135
Surface Combustion Corporation 15

Texaco, Inc. 27
Textile Machine Works, Contract Division .. 125
Thomas Flexible Coupling Co. 134
Timken Roller Bearing Co., The 64
Torrington Co., The 39
Townsend Co. 158

Udylite Corporation, The 30
Union Carbide Corporation, Union Carbide Metals Division 73
Union Carbide Corporation, Linde Division .. 28
Union Carbide Metals Co., Division of Union Carbide Corporation 73
Universal Cyclops Steel Corporation 114, 115
Universal Grinding Corporation 126

Vaughn Machinery Co., The 71
Virginia Gear & Machine Corporation 96

Wales Strippit, Inc. 78
Walsh Refractories Corporation 6
Ward Steel Co. 66
Wean Engineering Co., Inc., The .. Back Cover
Weinstein Co. 157
Weirton Steel Co. 11
Wheland Co., The 137
Wilson, Lee, Engineering Co., Inc. ..... Inside Back Cover
Wrought Washer Mfg. Co. 42

~ ~ ~

Table of Contents
Facing Inside Front Cover

Classified Advertising, Page 157

Coming Aug. 24 IN STEEL

Castings Tackle the Muscle Jobs

Answering a need for complex shapes with high strengths, a foundry is turning out steel castings with tensile strengths approaching 300,000 psi. These strengths are two to three times greater than most people realize is possible. At these levels, ductility and yield properties both are surprisingly high.

Although most applications so far have been in the demanding aircraft and missile industries, the ability to cast these hard working structural parts may well open up opportunities in other fields. Produced to close tolerances, the castings may justify their relatively high cost by eliminating fabrication steps or machining operations.

The article will show you some of the parts that have been cast. It also will tell what alloys have been used and what you can expect as typical properties.

CLAD REX 8-C

How to form and fabricate CLAD-REX® with existing equipment and methods

Clad-Rex vinyl-metal laminates can be formed and fabricated much like any unfinished sheet metal. No costly retooling or special, complex techniques are needed.

Die Forming and Drawing

The vinyl surface of Clad-Rex actually seems to enhance the forming and drawing characteristics of sheet metal. The vinyl in effect becomes a lubricant that permits better flow of metal. Often the tearing and wrinkling of complex draws in unfinished metal is practically eliminated when Clad-Rex is used.

Existing dies can be used by reducing the gauge of base metal to compensate for the thickness of the vinyl. Usually one gauge reduction is enough because the vinyl will compress up to 50% during forming. The inherent "memory" of the vinyl causes it to

Morton Manufacturing Co., Chicago, Ill.

retain any texturing despite temporary compression.

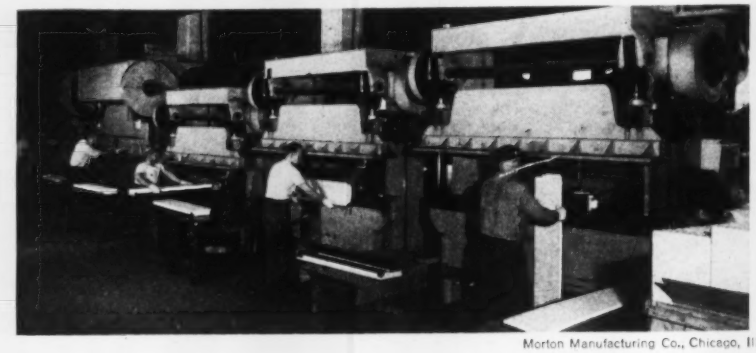
Die Lubricants and Degreasing

Any standard, light weight die lubricant may be used in forming or drawing Clad-Rex vinyl-metal laminate. However, water soluble or silicone base lubricants are recommended. Slip sheets of heavily waxed paper have also been used quite successfully.

White gasoline or a mild detergent is recommended for removing heavy grease. CAUTION: Trichlorethylene vapor degreasers or chlorinated solvents will adversely affect the vinyl to metal bond. With this exception, the vinyls and adhesives used in Clad-Rex laminates are practically impervious to acids, alkalis and other chemicals.

Bending, Shearing, Drilling, and Punching

Clad-Rex vinyl-metal laminates will withstand normal metal forming operations without damage. Using standard combination roll formers, Clad-Rex can be processed into Pittsburg locks, 90 or 180 degree crimp bends, double ogee and crimp rolls without vinyl rupture or delamination.

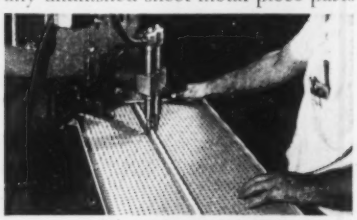


Morton Manufacturing Co., Chicago, Ill.

Clad-Rex will also withstand normal cutting operations. However, where possible, the vinyl side of the laminate should be exposed to the cutting edge. When using Clad-Rex laminated on both sides, the thinner gauge vinyl should be exposed.

Assembly and Fastening

Clad-Rex vinyl-metal laminate subassemblies can be fastened much like any unfinished sheet metal piece-parts



Reflector Hardware Corp., Melrose Park, Ill.

except for resistance welding. Here, projection welding techniques are most practical if the vinyl surface of weld area will be a finish surface.

The equipment required for suitable result must (1) be tooled for series welding (both electrodes on same side of sheet), and (2) be capable of very short weld times and extremely fast follow-up of forging pressures.

Epoxy resins are proving quite successful for assembly. Clamps can be eliminated by using resistance weld tacking or interlocking design.

Plating and Rust Proofing

All metal used in Clad-Rex vinyl-metal laminates is bonderized. However, Clad-Rex vinyl-metal laminates can be supplied with a variety of organic coatings on the metal underside. Or, Clad-Rex can be laminated on both sides.

After fabrication, Clad-Rex can be cadmium plated to protect all exposed edges, if required. These same edges can be sprayed or roller coated with vinyl paint as well.

A Source of Engineering Service

Clad-Rex interest in helping you extends into your own plant. A Clad-Rex Fabricating Engineer is provided to show your production people how easy it is to process Clad-Rex.

Furthermore, Clad-Rex operates a fully staffed and equipped research laboratory. Its facilities are devoted to customer service as well as improving Clad-Rex itself.

Write and describe your product. See how Clad-Rex can work its broad effect on your product.

VINYL-METAL LAMINATES BY CLAD-REX DIVISION OF SIMONIZ COMPANY

2105 Indiana Avenue • Chicago 16, Illinois

Telephone: VIctory 2-7272

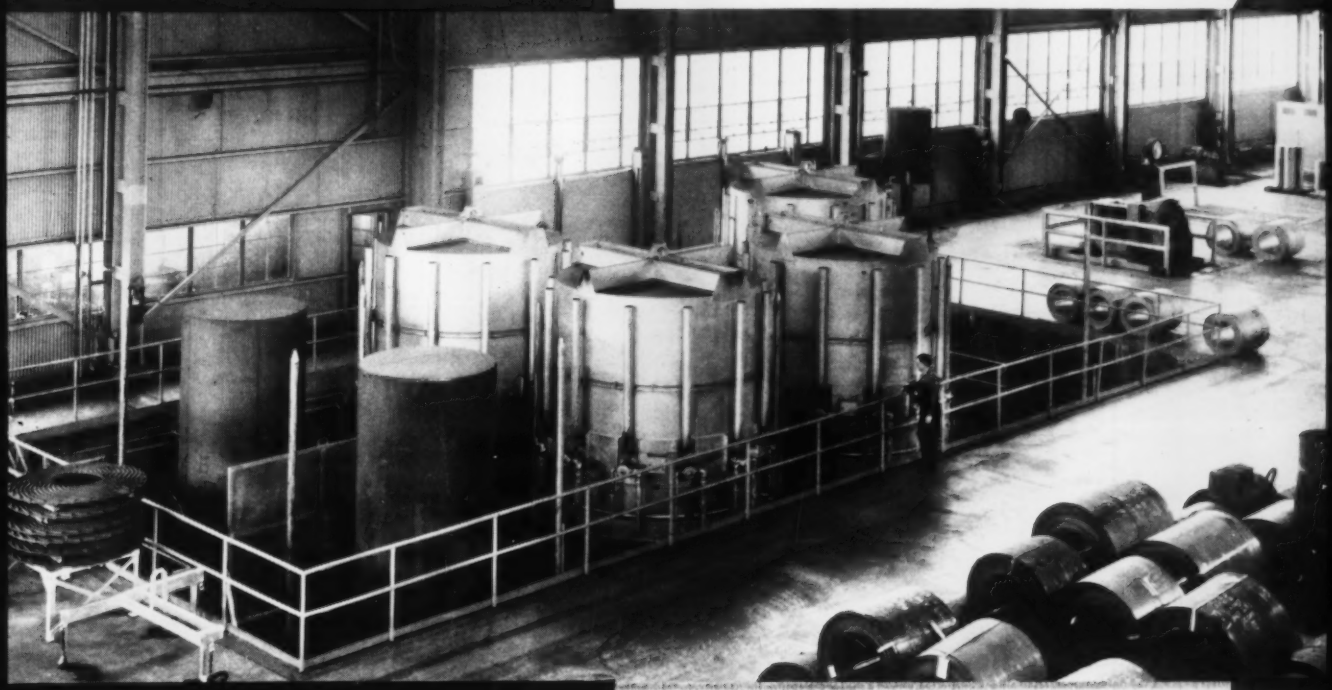
J·L, too, relies on *Lee Wilson* single stacks for finest chrome-stainless annealing!

No special atmosphere required... uniformity of physical properties declared excellent—Exacting uniformity of anneal is particularly desirous in chromium stainless steels. To make sure of the finest possible annealing Jones & Laughlin selected Lee Wilson single stack furnaces for their new Stainless and Strip Division plant at Louisville, Ohio.

No special atmosphere is required. The anneal develops a type of scale which is easily removed. The four furnaces and eight bases have capacity for 2800 tons per month.

Designed specifically for stainless annealing the installation includes cast alloy convector plates, oil-lubricated fan drive and alloy fan wheel designed to operate up to 1600°F. Because charges are uncovered at high temperatures heat shields have been installed between bases.

Standard or special Lee Wilson single stack furnaces are unequalled when it comes to quality, production and versatility.



Jones & Laughlin can process 2800 tons per month of chrome-stainless through the four Lee Wilson single stack annealing furnaces pictured above.

Lee Wilson® **ENGINEERING COMPANY, INC.**

20005 LAKE ROAD • CLEVELAND 16, OHIO

HIGH PRODUCTION ANNEALING SYSTEMS

MAKE THE BEST METALS BETTER

® ORIGINATORS AND LEADING PRODUCERS OF OPENED COIL AND SINGLE STACK FURNACES

No. 5 Electrolytic Tinning Line, Gary Sheet and Tin Mill, U. S. Steel Corporation

Wean, U. S. Steel and Tinning . . .

Twenty-two years ago the world's first commercial production electrolytic tinning line went into operation. Using the "Ferrostan" process, which was developed by U. S. Steel, the line was engineered by Wean and technical personnel of U. S. Steel.

The years of experience and constant progress since that initial installation are incorporated in this "Ferrostan" line. It features the most modern advances in automated tinning line design: cleaning and plating tanks are elevated to reduce basement complexity and simplify maintenance; both recoiling and shearing equipment are provided to satisfy all customer requirements; and an electronic data-logging system provides a "process profile" of all coiled tin plate.

Wean is justly proud of its many years of leadership in tinning line technology: 75% of all electrolytic tin plate produced is the result of Wean's *creative engineering.*

THE WEAN ENGINEERING COMPANY, INC. · WARREN · OHIO